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THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND AND GARDINER'S ISLAND

By Stewart H. Burnham and Roy A. Latham

Second Supplementary List*

The following local observers have assisted in this list, by collecting or reporting unusual species; therefore establishing many new records and also new stations for species already reported in the two preceding lists. Mrs. F. R. Mitchell of Southold is specially mentioned for kindness in allowing a study of her long and interesting list of plants collected by herself and the late Mr. Mitchell, mostly in the vicinity of Southold, a decade or more ago. Mrs. Frank D. Smith of Peconic, Miss Mabel R. Wiggins of East Marion and William C. Ferguson of Hempstead should be mentioned. The following botanists have visited and collected in the region: Mrs. Agnes Chase, Mr. Wm. T. Davis, Mr. Norman Taylor and others.

Insect Galls†

Asteromyia carbonifera Felt—On leaves of *Euthamia tenuifolia.*

Caryomyia tubicola O.S.—On leaves of *Hicoria glabra* at Cutchogue.

Cecidomyia verrucicola O.S.—On leaves of *Tilia americana* at Southold.

Dasyneura Lysimachiae Beutm.—On *Lysimachia quadrifolia* at Orient.

Disholcaspis mamma Walsh—On twigs of *Quercus velutina* at Greenport.

Eriophyes Cephalanthi Cook—Greenport on leaves of *Cephalanthus occidentalis.*

E. semen Walsh—Orient on leaves of *Salix.*

Hormomyia canadensis Felt—Cutchogue on leaves of *Amelanchier oblongifolia.*

Lasioptera clavula Beutm.—On twigs of *Cornus* at Cutchogue, Greenport and Southold.

[No. 6, Vol. 20, of Torreya, comprising pp. 107–140, was issued 7 February 1921]

* The preliminary flora was published in Torreya 14: 201–225. Nov. 1914, and 229–254. Dec. 1914. The First Supplementary List was published in Torreya 17: 111–122, July 1917.

† The majority of these galls were named by Dr. E. P. Felt, state entomologist of the State of New York.

L. nodulosa Beutm.—Orient on stems of *Rubus.*

Livia maculipennis Fitch—On the inflorescence of *Juncus canadensis.*

Neolasioptera ramuscula Beutm.—On stems of *Doellingeria umbellata* at Orient.

Phylloxera Caryaesemen Walsh—Orient on the under surface of the leaves of *Hicoria glabra.*

Rhabdophaga strobiloides Walsh—On the tips of branches of *Salix humilis* at Peconic.

Rhopalomyia hirtipes O.S.—On aerial stems of *Solidago juncea* at Cutchogue and Peconic.

Euphyceae

Antithamnion americanum (Harv.) Farl.—In the Sound at Orient; determined by Dr. M. A. Howe.

Nitella intermedia Nordst.—Great Pond, Southold; determined by Dr. Howe who has examined specimens twice, and says, "this species or something close to it."

Phycomycetes

Empusa americana Thaxt.—On blow-flies, *Calliphora vomitoria* at Orient; determined by Prof. John Dearness. Many thousands of these flies are killed by this fungus during cold, wet spells in the summer. They are usually found clustered on the softer parts of grape vines.

Rhysotheca Haldstedii (Farl.) Wils.—On leaves of *Helianthus* in woods at Orient; determined by Prof. Dearness.

Ascomycetes (Excluding Pyrenomycetes)

Cudoniella marcida (Müll.) Sacc.—On earth in rich woods at Cutchogue. September. Determined by Dr. C. G. Lloyd as *Leotia marcida* Pers.: Mycol. Notes 63: 964. May 1920.

Geoglossum Farlowi Cke.—On earth in rich woods at Greenport. October. Determined by Dr. Lloyd who says "it is a very rare plant with spores 3-septate, 80 mic. long in these." It is difficult to believe, however, that it is other than a spore variation of the more common *Geoglossum hirsutum* Pers.

Peziza odorata Pk.—On ashes in a cellar at Orient; determined by Dr. Charles E. Fairman.

Phialea scutula (Pers.) Gill.—On dead herbaceous stems at Orient; determined by Dr. Fairman.

Pseudophacidium Betulae Rehm.—On twigs and small branches of *Betula populifolia* at Orient. Spring. Determined by Dr. Fairman, who says the find is noteworthy; and confirmed by Dr. E. J. Durand, who reports that it agrees with Rehm's Ascomyceten No. 866 in his herbarium.

Tapesia sanguinea (Pers.) Fckl.—On wood of *Juniperus virginiana* at Orient; determined by Dr. Fairman.

Ascomycetes (Pyrenomycetes)

Anthostoma gastrinum (Fr.) Sacc.—On dead branches of *Amelanchier canadensis* at Orient; determined by Prof. Dearness.

Botryosphaeria fuliginosa (M. & N.) E. & E.—Orient on stems of *Smilax rotundifolia;* determined by Prof. Dearness. No. 2107.

Camarosporium Robiniae (West.) Sacc.—Orient on *Robinia Pseudo-acacia,* associated with *Cucurbitaria elongata* (Fr.) Grev. No. 702. N. Y. State Mus. Bull. 197: 25. 1918.

Cryptospora aculeans (Schw.) E. & E.—On stems and twigs of *Rhus copallina* and *Toxicodendron radicans* at Orient; determined by Prof. Dearness.

Diaporthe (*Chorostate*) *cercophora* (Ell.) Sacc.—On dead twigs and branches of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

Diaporthe (*Euporthe*) *cryptica* Nitschke—Orient on stems of *Lonicera japonica;* determined by Prof. Dearness.

Diaporthe (*Euporthe*) *euspina* (C. & E.) Sacc.—Base of stems of *Chenopodium ambrosioides* at Orient; determined by Prof. Dearness.

Diaporthe (*Chorostate*) *oxyspora* (Pk.) Sacc.—On twigs and branches of *Ilex verticillata* at Orient. N. Y. State Mus. Bull. 197: 38. 1918. (*Diaporthe ocularia* (C. & E.) Sacc.)

Diatrype Baccharidis Earle—Orient on stems and branches of *Baccharis halimifolia;* determined by Prof. Dearness. No. 4033.

D. disciformis (Hoffm.) Fr.—On branches of *Myrica caroliniensis* at Orient; determined by Prof. Dearness.

Diatrypella verrucaeformis (Ehrh.) Nitschke—On trunks of *Myrica caroliniensis* at Orient; determined by Dr. Fairman.

Didymosphaeria Celtidis E. & E.—On twigs of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

Dothidea collecta (Schw.) E. & E.—Orient on twigs of *Iva frutescens;* determined by Prof. Dearness.

Erysiphe Cichoracearum DC.—On leaves and stems of *Plantago Rugelii* at Orient; determined by Dr. Fairman.

Eutypa leucostroma (Mont.) Sacc.—On stems of *Smilax rotundifolia* at Orient; determined by Dr. Fairman.

E. sepulta (B. & C.) E. & E.—Orient on stems of *Smilax rotundifolia;* determined by Prof. Dearness.

Eutypella cerviculata (Fr.) Sacc.—On branches of *Celtis occidentalis* at Orient; determined by Prof. Dearness.

E. Gleditschiae Berl.—On dead twigs of *Gleditschia triacanthos* at Orient. No. 724. N. Y. State Mus. Bull. 197: 29. 1918.

E. scoparia (Schw.) E. & E.—Orient on twigs of *Robinia Pseudo-acacia;* determined by Prof. Dearness. No. 1041.

E. venusta (Ell.) Sacc.—Orient on twigs of *Robinia Pseudo-acacia;* determined by Prof. Dearness. No. 1198.

Gibberella pulicaris (Fr.) Sacc.—On stalks of *Zea Mays* at Orient; determined by Dr. Fairman.

Gloniella ovata (Cke.) Sacc.—On decorticated and weathered wood of *Castanea dentata* at Orient. "The type of this species (collected by Ravenel in Carolina) is said to be on oak." No. 824. N. Y. State Mus. Bull. 205–206: 51. 1919.

Gloniopsis Cookeana (Ger.) Sacc.—Orient on dead wood of *Quercus alba,*

dead branches of *Myrica caroliniensis,* dead decorticated branches of *Rhus glabra* and *Xolisma ligustrina.* N. Y. State Mus. Bull. 197: 39. 1918.

Guignardia Bidwellii (Ellis) Viala & Ravaz—On fruit of cultivated grapes; determined by Prof. Dearness and Dr. Fairman. It is associated with *Phoma uvicola* B. & C. which Rostrup states is a stage of *Guignardia Bidwellii.*

Hypocrea rufa (Pers.) Fr.—A Corticium-like plant growing on oak; determined by Prof. Dearness. No. 3387.

Hypoxylon multiforme Fr.?—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

H. rubiginosum (Pers.) Fr.—Orient on dead branches of *Rhus copallina;* determined by Prof. Dearness.

Hysterographium Lesquereuxii (Duby) Sacc.—On dead branches of *Gleditschia triacanthos* at Orient. N. Y. State Mus. Bull. 197: 30. 1918.

H. Vaccinii (Schw.) Fairman—This combination was made in the First Supplementary List in Torreya 17: 113. July 1917: but was wrongly spelled *Hysteriographium Vaccinii.*

Massaria conspurcata (Wallr.) Sacc.—On twigs of *Padus virginiana* (*Prunus serotina* Ehrh.) at Orient. Determined by Dr. Fairman, who says, "spores 60–65 × 13.5–14 μ." According to Ellis & Everhart, your specimen has spores agreeing more with those distributed by Dr. Rehm (in his Ascomyceten) than what Ellis noted in this country. That is, they are about the same width as foreign specimens and wider than those usually found here.

Massarinula Brassicae Dearn. & House—On dead stems of Brussels Sprouts, *Brassica oleracea gemmifera,* at Orient. September 1915. Type in the herbarium of the N. Y. State Museum. Described in N. Y. State Mus. Bull. 197: 31. 1918.

Microsphaera Alni (Wallr.) Salmon—The var. *Vaccinii* (Schw.) Salmon on leaves of *Vaccinium corymbosum* at Orient; determined by Prof. Dearness.

Phyllachora Graminis (Pers.) Fckl.—The var. *Panici* (Schw.) Spear on leaves of *Panicum cladestinum,* common throughout the town; determined by Prof. Dearness.

P. Pteridis (Reb.) Fckl.—On fronds of *Pteridium aquilinum* at Mattituck; determined by Prof. Dearness.

Pyrenophora calvescens (Fr.) Sacc.—On *Chenopodium ambrosioides;* determined by Prof. Dearness.

Rosellinia protuberans Karst.—Orient on wood of *Baccharis halimifolia;* determined by Dr. Fairman.

R. pulveracea (Ehrh.) Fckl.—On twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Sphaerella pardalota C. & E.—Orient on old leaves of *Myrica caroliniensis;* determined by Dr. Fairman.

Trematosphaeria nuclearia (DeNot.) Sacc.—On decaying nuts of *Hicoria glabra* at Orient; determined by Prof. Dearness. No. 1202.

Valsa Liquidambaris (Schw.) Cke.—On dead stems of *Hamamelis virginiana* at Orient. "A new host species. The asci are 30–33 × 8 μ, the spores eight in an ascus, 8–9 × 2 μ, hyaline, allantoid." N. Y. State Mus. Bull. 197: 45. 1918.

V. Pini (A. & S.) Fr.—On dead bark and twigs of *Pinus Strobus* at Greenport; determined by Prof. Dearness. The fallen trunk of one tree that had been cut about a year was completely covered with this species, abundantly fruiting.

V. subclypeata C. & P.—Orient on dead branches of sassafras; determined by Prof. Dearness.

Xylaria corniformis Fr.—On buried roots of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 66: 4. Oct. 1917.

Hypomycetes

Cercospora Acalyphae Pk.—Orient on leaves of *Acalypha gracilens;* determined by Prof. Dearness.

C. circumscissa Sacc.—Common at Orient on leaves of *Padus virginiana* (*Prunus serotina*); determined by Prof. Dearness.

C. copallina Cke.—Cutchogue on leaves of *Rhus copallina;* determined by Prof. Dearness who says, "this is likely only a synonym of *Cercospora rhoina* C. & E."

C. rhoina C. & E.—On leaves of *Rhus copallina* at Cutchogue; determined by Prof. Dearness.

Cladosporium herbarum (Pers.) Link—Orient on leaves of *Hemerocallis fulva;* determined by Prof. Dearness.

Exosporium Tiliae Link—Orient on dead branches and trunks of *Tilia vulgaris;* determined by Prof. Dearness.

Fusarium Celtidis Ell. & Tracy—Orient on twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Melanconiales

Cylindrosporium Iridis E. & H.—On living leaves of *Iris versicolor* at Orient. N. Y. State Mus. Bull. 197: 27. 1918.

Gloeosporium Opuntiae E. & E.—On leaves of *Opuntia;* determined by Dr. Fairman. Large patches of the Eastern Prickly Pear have been killed by this fungus at Orient.

Marsonia Potentillae (Desm.) Fisch.—Greenport on leaves of *Potentilla canadensis;* determined by Dr. House.

Melanconium betulinum Schm. & Kze.—On twigs of *Betula populifolia* at Greenport; determined by Dr. Fairman.

Pestalozzia uncinata Ell. & Kell.—On leaves of *Quercus velutina;* determined by Dr. House.

Stagonospora Chenopodii Pk.—(*Phleospora Chenopodii* E. & K.) On leaves of *Atriplex hastata,* common at Orient; determined by Prof. Dearness.

Steganosporium acerinum Pk.—Orient on dead branches of *Acer Pseudo-Platanus.* Determined by Prof. Dearness who says, "may be a synonym of *Steganosporium piriforme* (Hoffm.) Cda.: Mr. Ellis used to call the larger spore form *S. cellulosum* Cda. and the smaller spore form *S. piriforme.* The spores are $36 \times 18\,\mu$."

Sphaeropsideae

Coniothyrium concentricum (Desm.) Sacc.—On leaves of cultivated *Yucca* at Orient; determined by Prof. Dearness.

Leptostromella Chenopodii Dearn. & House—Orient on dead stems of *Chenopodium album.* Described in N. Y. State Mus. Bull. 205–206: 53–54. 1919.

Macrophoma celtidicola Dearn. & House—Orient on twigs of *Celtis occidentalis;* determined by Prof. Dearness.

Phlyctaena arcuata Berk.—Orient on dead stems of *Helianthus annuus.* No. 726. "Spores filiform arcuate to falcate, 25 μ long." N. Y. State Mus. Bull. 205–206: 55. 1919.

Phoma Celtidis Cke.—On twigs of *Celtis occidentalis;* determined by Prof. Dearness. No. 3388.

Phyllosticta Chenopodii Sacc.—On leaves of *Chenopodium album* at Orient; determined by Dr. Fairman.

P. Kalmicola Schw.—Greenport on leaves of *Kalmia latifolia;* determined by Prof. Dearness.

Phyllosticta limitata Pk.—On leaves of apple, *Malus;* determined by Prof. Dearness. Very abundant throughout the town during the summer of 1919: and practically defoliating some trees.

P. minima (B. & C.) E. & E.—Laurel on leaves of *Acer rubrum;* determined by Dr. Fairman.

P. Sassafras Cke.—On leaves of *Sassafras,* common throughout the township. Determined by Prof. Dearness who says, "Ellis and Everhart in their North American Phyllostictas say the specimens available for examination are all sterile and that the species must be put in the doubtful class. The spots on some of these leaves have pycnidia with the small spores of the description; but most of the spots are sterile."

Septoria brunneola (Fr.) Niessl.—Cutchogue on leaves of *Vagnera racemosa;* determined by Prof. Dearness.

S. Macrosporia Dearn.—On leaves of *Chrysanthemum Leucanthemum* at Orient. Prof. Dearness says, "externally it is exactly like it but the spores fall short in average size."

S. mollisia Dearn & House—Mattituck on leaves of *Antennaria plantaginifolia;* determined by Prof. Dearness, who says this may be the same as Fairman's *Septoria lanaria.*

S. Polygonorum Desm.—Orient on leaves of *Persicaria Persicaria;* determined by Prof. Dearness.

S. Stellariae Rob. & Desm.—On leaves of *Alsine media* at Orient. Determined by Prof. Dearness who says, "the same as Fungi Columb. No. 775, which Mr. Ellis named as the above. It is not very distinct from *Septoria Silenicola* Ell. & Mart."

S. Violae West.—Greenport on leaves of *Viola cucullata;* determined by Prof. Dearness.

Sphaeronema Robiniae B. & C.—On twigs and branches of *Tilia americana* at Orient; determined by Prof. Dearness.

Sphaeropsis Celtidis E. & E.—On twigs of *Celtis occidentalis* at Orient. No. 3561. Determined by Dr. Fairman who says, "Cfr. Am. Nat. 428. 1897 and Saccardo Syl. 14: 921. I have never had this before: it was originally named from a specimen collected by Bartholomew on *Celtis occidentalis* in Kansas."

S. Syringae C. & E.—Orient on twigs of *Syringa vulgaris;* determined by Dr. Fairman.

Vermicularia herbarum West.—On old stems of *Geranium maculatum* at Orient; determined by Prof. Dearness.

USTILIGINACEAE

Sorosporium Syntherismae (Pk.) Farl.—Orient on *Panicum dichotomiflorum;* determined by Dr. G. P. Clinton.

UREDINACEAE*

Peridermium Peckii Thüm.—Common. On *Azalea viscosa* at Greenport, Peconic and Southold. On *Gaylussacia baccata* at Cutchogue. (*Pucciniastrum Myrtilli* (Schum.) Arth.)

P. pyriforme Pk.—Found sparingly during August on leaves of *Comandra umbellata* at Mattituck. (*Cronartium Comandrae* Pk.)

Pucciniastrum Agrimoniae (Schw.) Tranz.—Orient on leaves of *Agrimonia gryposepala.*

P. Pyrolae (Pers.) Diet.—Southold on *Chimaphila maculata;* but one collection found.

PUCCINIACEAE

Puccinia Anemones-Virginianae Schw.—On leaves of *Anemone Virginiana* at Indian Neck, Peconic. August.

P. Circaeae Pers.—Orient on leaves of *Circaea Lutetiana.*

P. Ellisiana Thüm.—Orient on *Schizachyrium scoparium.* November.

P. investita Schw.—On *Gnaphalium obtusifolium* at Cutchogue, Orient and Peconic. August.

P. minutissima Arth.—Mattituck on stems and leaves of *Decodon verticillatus.* August. Very common in one swamp and forming large swellings on stems and the midveins of leaves. (*Aecidium Nesaeae* Ger.)

P. patruelis Arth.—On leaves of *Lactuca canadensis* at Orient. June. Dr. Arthur says, "lately has been called *Puccinia hieraciata* (Schw.) Jackson. This is rather a rare rust in New York and in fact throughout the Atlantic states: but is very common in the interior. It has telia on various species of *Carex.*".

Uromyces Hyperici-frondosi (Schw.) Arth.—Gardiner's Island on leaves of *Hypericum mutilum;* determined by Burnham.

U. Lespedezae-procumbentis (Schw.) Curt.—On *Lespedeza capitata* at Cutchogue, Peconic and Southold. On *Lespedeza virginica* at Cutchogue. Locally common at these stations. (*Nigredo Lespedezae-procumbentis* (Schw.) Arth.)

* Unless otherwise stated the Rusts were determined by Dr. J. C. Arthur.

U. Polemonii (Pk.) Barth.—N. Y. State Mus. Bull. 197 : 13. 1918, as a contribution; probably on *Spartina stricta alterniflora.*

Tremellaceae

Dacryomyces deliquescens (Bull.) Duby—On old wood of *Juniperus virginiana;* determined by Dr. Lloyd: Mycol. Notes 63 : 964. May 1920.

Exidia recisa Fr. On branches of *Quercus velutina* at Orient; determined by Dr. Lloyd: Mycol. Notes 63 : 964. May 1920.

Naematelia nucleata (Schw.) Fr.—On old bark of *Quercus velutina;* determined by Dr. Lloyd (printed) : Letter 66 : 4. Oct. 1917.

Thelephoraceae

Aleurodiscus nivosus (B. & C.) v. Höhn & Litsch.—On bark of *Juniperus virginiana* at Orient. No. 189. (In Mo. Bot. Gard. Herb., 44228) (*Stereum acerinum* Pers., var. *nivosum* B. & C.) Ann. Mo. Bot. Gard. 5 : 195. 1918.

Craterellus cornucopioides (L.) Pers.—" Note 862. The common *Craterellus cornucopioides* is usually so regular and cup shaped that we were somewhat surprised to receive a collection lobed and almost divided at the base, from Mr. Latham. We supposed that it had been torn accidentally but Mr. Latham stated that it grew naturally in this way and he found a large colony of this form." Dr. Lloyd's Mycol. Notes 63 : 965. May 1920.

Cyphella muscigena (Pers.) Fr.—*Thuidium paludosum* has been found " only in one locality, a blackish meadow in Orient. It is common there, but rarely fruiting. It is a frequent host of *Cyphella* in this plot. There are several other species of musci associated with the *Thuidium.* It is interesting that the fungus should go commonly to this single species and not at all to the others." Bryol. 23 : 7. Jan. 1920. Determined by Dr. Fairman.

Hymenochaete agglutinans Ellis—On *Sassafras;* determined by Prof. Dearness.

H. corrugata (Fr.) Lev.—Orient. No. 154. (In Mo. Bot. Gard. Herb., 44229.) Determined by Dr. E. A. Burt. Ann. Mo. Bot. Gard. 5 : 361. 1918.

Thelephora multipartita Schw.—On earth in woods at Orient; determined by Dr. Lloyd: Mycol. Notes 63 : 965. May 1920.

Thelephora spiculosa Fr.—On earth in dry woods at Cutchogue; determined by Dr. Lloyd who says " rare."

Tremellodendron merismatoides (Schw.) Burt—On heavy soil in woods at Orient; determined by Dr. Lloyd.

Hydnaceae

Hydnum caryophylleum B. & C.—On old wood of *Hicoria glabra* at Orient; determined by Prof. Dearness.

H. vellereum Pk.—In dry woods at Cutchogue. Dr. Lloyd says, " quite fragrant when received ": Mycol. Notes 63 : 964. May 1920, as *Hydnum amicum* Quel.

H. zonatum of American Mycology—In dry woods on earth at Cutchogue. Determined by Dr. Lloyd: Mycol. Notes 63 : 964. May 1920, as *Hydnum scrobiculatum* Fr.

Phlebia merismoides Fr.—Orient on *Prunus Avium;* determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Radulum pallidum B. & C.—On underside of a decayed log of *Pinus Strobus* in a swamp at Greenport; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Polyporaceae

Daedalea ochracea Lloyd—On oaks at Cutchogue; determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920. Under Note No. 137, Dr. Lloyd says, "I would designate the light colored forms of *Daedalea unicolor* . . . which correspond to *Polystictus ochraceus* as forms of *Polystictus hirsutus*."

Merulius bellus B. & C.—Orient, "comm. by N. Y. State Herb., P66 (in Mo. Bot. Gard. Herb., 43604)." Ann. Mo. Bot. Gard. 4: 332. Nov. 1917.

Merulius brassicaefolius Schw.—On earth in a cellar at Orient; determined by Dr. Lloyd.

Polyporus brumalis (Pers.) Fr.—Greenport on *Vaccinium;* Orient on wild cherry; and Southold on *Sambucus canadensis.*

P. (*Ganoderma*) *Curtisii* Berk.—On trunks of living apple tree. Determined by Dr. Lloyd who says, "this is a southern unvarnished form of *Polyporus lucidus,* it is quite common in the south, but rarely found as far north as with you" (printed): Letter 67: 7. July 1918. Previously reported as *Ganoderma pseudoboletus* (Jacq.) Murrill.

P. pocula (Schw.) B. & C.—Orient on living bark of *Quercus velutina* at Orient. Found growing in clusters in April. Determined by Dr. Lloyd who says, "a unique little species": Mycol. Notes 63. 965. May 1920.

P. stipticus (Pers.) Fr.—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 66: 4. Oct. 1917.

P. trabeus Rostk.—On wood of *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

Polystictus dependens B. & C.—On the underside of a log of *Pinus rigida* at Cutchogue. September. No. 2080. A colony of about a dozen plants ranging from ¼ to ¾ of an inch in diameter. "Note 861. A rare species (Cfr. Stip. Polyporoids, p. 165) only known from a few stations in the south. This is the only collection in any way northern. Otherwise it is only known from one collection from Japan": Dr. Lloyd's Mycol. Notes 63: 965. May 1920.

Polystictus hirsutus (Wulf.) Fr.—The form *Polystictus hirsutulus* Schw. on *Quercus velutina* at Orient; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Poria omoema Berk.—On limbs of *Betula populifolia* at Orient; determined by Prof. Dearness who says a similar plant was named this species for him by Mr. Ellis. The type of this species was collected on pine in South Carolina by Mr. Ravenel. (= *Poria subacida* (Pk.) Sacc.)

Agaricaceae

Crepidotus applanatus (Pers.) Fr.—Orient on trunks of *Quercus velutina;* determined by Dr. Lloyd (printed): Letter 67: 7. July 1918.

Lenzites albida Fr.—On trunk of *Acer rubrum* at Greenport; determined by Dr. Lloyd who says, "the old, bleached white, wintered, lenzitoid form of *Daedalea confragosa*."

L. corrugata Klotsch.—Orient on oaks and *Sassafras;* determined by Dr. Lloyd (printed): Letter 69: 7. April 1919.

Panus strigosus B. & C.—Formerly reported from Orient as *Panus levis* Berk. The Orient plant is figured in Dr. Lloyd's Mycol. Notes 52: 746. fig. 1120. Dec. 1917.

Pleurotus niger Schw.—On terminal branches of *Rhus copallina* at Orient. Plants ⅛ of an inch in diameter and slaty black. Dr. Lloyd says it is rare (printed): Letter 69: 7. April 1919.

P. sapidus Klachb.—On stumps of *Hicoria glabra* at Orient; determined by Dr. Lloyd (printed): Letter 69: 7. April 1919, and Mycol. Notes 63: 965. May 1920.

Gasteromycetes

Calvatia lilicina Berk.—On earth in rich woods at Orient; determined by Dr. Lloyd: Mycol. Notes 63: 965. May 1920.

Dictyophora duplicata (Bosc) Ed. Fisch.—On earth in moist woods at Cutchogue, Orient and Southold; determined by Dr. Lloyd as *Phallus duplicatus:* Mycol. Notes 63: 964. May 1920.

Lycoperdon gemmatum Batsch—On pure sand at Orient; determined by Dr. Lloyd.

Scleroderma Cepa Pers.—On pure sand in shade of pines and open ground at Southold; determined by Dr. Lloyd: Mycol. Notes 63: 964. May 1920.

Musci

Amblystegium varium (Hedw.) Lindb.—Orient at the base of a hickory tree about a moist cavity; determined by Mr. G. B. Kaiser.

Fontinalis gigantea Sulliv.—Swamp woods in water at Mattituck; determined by Dr. A. J. Grout. No. 1736.

Mnium cinclidioides Hüben.—In a swamp at Mattituck. No. 1843. Determined by Dr. Grout who says, "a depauperate form . . . the first to be reported from Long Island so far as I know, although it apparently is frequent along the west bank of the Hudson river."

Polypodiaceae

Adiantum pedatum L.—Southold, localized in moist woods south of Great Pond. The reference to this species in the first part of this Flora was an error: the above record is the only known station in the town. It was first discovered many years ago by Miss Mary H. Huntting and reported by Mrs. Frank D. Smith.

Polypodium vulgare L.—Sandy soil at Orient. No. 2331.

Polystichum acrostichoides (Mx.) Schott—Rare in woods south of Great Pond, Southold, Sept. 10, 1919. No. 4088.

LYCOPODIACEAE

Lycopodium adpressum (Chapm.) Lloyd & Underw.—Southold in a sandy bog. No. 3455.

L. obscurum L.—Moist woods at Orient and Southold.

(To be continued)

NEW COMBINATIONS FOR PHANEROGAMIC NAMES

BY J. C. ARTHUR

In order to secure uniformity in citing the names of hosts for species of Uredinales the following new combinations are proposed. So far as the writer can ascertain these combinations have not been made before, and in coming to this conclusion he has had the kindly assistance of a number of correspondents.

Cnidoscolus urens (L.) comb. nov. (*Jatropha urens* L. Sp. Pl. 1007. 1753). A common plant of tropical America, bearing *Uromyces oaxacanus* Diet. & Holw.

Adenoropium angustifolium (Griseb.) comb. nov. (*Jatropha angustifolia* Griseb.; Goett. Nachr. 171. 1865). A Cuban species bearing the imperfectly known rust *Uredo jatrophicola* Arth.

Vincetoxicum bifidum (Hemsl.) comb. nov. (*Gonolobus bifidus* Hemsl., Biol. Centr. Am. Bot. **2**: 330. 1879).

Vincetoxicum erianthum (Decaisne) comb. nov. (*Gonolobus erianthus* Decaisne; DC. Prodr. **8**: 592. 1844).

Vincetoxicum uniflorum (H.B.K.) comb. nov. (*Gonolobus uniflorus* H.B.K. Nov. Gen. Sp. **3**: 207. 1818). These three Mexican species of Vincetoxicum, belonging to the Asclepiadaceae, bear the very common tropical rust *Puccinia obliqua* Berk. & Curt.

Sphaeralcea arcuata (Greene) comb. nov. (*Malvastrum arcuatum* Robinson; A. Gray, Synop. Fl. N. Am. **1**[1]: 311. 1878).

Sphaeralcea fasciculata (Nutt.) comb. nov. (*Malva fasciculata* Nutt.; T. & G. Flora N. Am. **1**: 225. 1838). These two Californian species belonging to Malvaceae bear the common western rust *Puccinia Sherardiana* Körn.

Madronella viridis (Jepson) comb. nov. (*Monardella viridis* Jepson, Flora W. Mid. Calif. 465. 1901). A plant of western California bearing *Puccinia Monardellae* Dudl. & Thomp., a distinctively Californian rust.

Coleosanthus megalodontus (Greenm.) comb. nov. (*Brickellia megalodonta* Greenm. Proc. Am. Acad. **40**: 34. 1904). A Mexican plant bearing the rust *Puccinia Brickelliae* Peck.

Purdue University,
Lafayette, Indiana

SHORTER NOTES

Notes on Hemerocallis, II.—A previous note (Amer. Mid. Nat. 1914–15) dealt with the nomenclature, specific description, and the distribution of the North American members of this genus, *H. fulva* and *H. flava*. In 1917, the writer conducted experiments upon *H. fulva*, obtaining results which appear to be of interest if only from a negative standpoint, since the experimental procedure involved seems somewhat similar to the more probable physiological forces at work in the conditions under which the plant forms mature seeds.

Referring to Knuth's Handbook of Flower Pollination, we read that, "according to Sprengel's assertion which Kerner confirms, the plant (*H. fulva*) never sets fruit here, so it is highly probable that in its original home in E. Asia, it is pollinated by such insects as are not to be found in Europe. Maximowicz states that artificial pollination is also ineffective, the flowers do not produce mature seeds in Europe. Sprengel, who pollinated the flowers artificially with their own pollen, also obtained no fruits, etc."

No such limitations affect *H. flava*, indeed Linnaeus believed *H. flava* and *H. fulva* (commonly known as the yellow lily and day lily respectively) to form a composite type species (*H. lilio-asphodelus*), for the genus, and that one was really a variety of the other, a fact readily comprehensible when their great anatomical, if not physiological resemblance, be kept in mind.

Largely from the basis of the preceding information the writer attempted to produce mature seeds in *H. fulva.* The experiments conducted divided themselves into four groups:

I. Fertilization of the flowers with their own pollen.

a. After the blossoms had completely opened.

b. Before the blossoms had opened sufficiently for them to be pollinated from other sources, but when their own pollen seemed about to discharge.

c. Before the blossoms had opened sufficiently to obtain pollen from other sources, an incision was made in the ovary, and pollen as obtained in the preceding placed therein.

d. Before the blossom had completely opened the stigma was snipped off, and pollen placed directly upon the top of the style.

II. Fertilization of the flower with pollen from the same clump of day lilies. In this group further procedure was essentially similar to that outlined in Group I, except that the anthers of the flower were first removed.

III. Fertilization of the flowers with the pollen of a far removed clump of day lilies. Inquiry revealed the fact that this group of the plants and that used in Group I did not have a common original locality and were probably genetically distinct. In Group III also the further procedure was similar to Group I, except that the anthers of the pollinated flower were first removed.

IV. Fertilization of the flowers with pollen from the yellow lily, *H. flava.* Attempts at cross-fertilization were made as already indicated in the other groups.

Control of the above experiments was obtained by tying a small paper bag over each experimental flower. *The results of the above experiments were negative in every respect.* No mature seeds were ever formed. An effect of the paper bags was to lengthen the life of the flower appreciably.

In a previous number of TORREYA (Vol. 18, Dec. 1918), double flowers were reported for *H. fulva.* Continued observation indicates that such seem common in the Mississippi river region from Missouri up to St. Paul, Minn. In some localities no other type of flower was observed.

N. M. GRIER

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REVIEWS

Gager's Heredity and Evolution in Plants

Under this comprehensive title, Dr. C. Stuart Gager has recently published a little book (P. Blakiston's Son & Co., pages xiii + 265, price $1.25) of remarkable interest: remarkable in that it presents within so small a compass a digest of such broad and complex subjects.

The whole book may be summarized in a few lines. The reproductive system is the machinery for heredity; long-continued heredity is evolution; the results of evolution are expressed by the morphological differentiation of plants and by their distribution in space and time. Each of these themes is discussed by the author in turn.

Under the first head, the author devotes two chapters to the life history of a fern, wisely selecting for illustration a plant with well developed gametophyte rather than an angiosperm. The third chapter introduces some general considerations based on the facts presented in the two preceding, and discusses briefly but clearly the general nature of reproduction, alternation of generations, and reduction; this is followed by a general definition of inheritance and an entirely too brief discussion of the struggle for existence and the elimination of the unfit. Unfortunately this portion is marred by two rather serious errors or omissions.

The fourth chapter deals with the laws of heredity. Here the reviewer, who makes no pretence of erudition in genetics, at once came into difficulties. On page 40, inheritance is defined as "the recurrence in successive generations of a similar cellular constitution," while on page 48 the statement is made that inheritance is "all that an organism has to start with. It is the protoplasmic substance, with all its potentialities, passed on from parent to offspring." Now thorns recur on successive generations of roses, agreeing with the first definition, but a young rose does not have thorns to start with. Would it not have been just as clear to the general reader if inheritance had been defined as the potentiality of the protoplasmic substance passed on from

parent to offspring? The author then shows the distinction between inheritance and expression of heredity, and passes on to chapter 5, the experimental study of heredity. About half of this is devoted to an exposition of the well known work of Mendel and the rest to the work of Johannsen and Weismann, including a statement of the general unsolved problems developed as a result of their investigations.

Chapters 6 and 7 discuss the general nature of evolution, which is regarded as the major problem of botany, describing the ideas of Agassiz and Lamarck briefly and those of Darwin and Wallace in greater detail. These two chapters impress the reviewer as unusually well written. Chapter 8, on experimental evolution, is devoted almost entirely to a summary of the methods and results of De Vries' experiments and to the mutation theory in general.

The second half of the book deals with the results of evolution in plants, attempting to present modern ideas on the genetic relations of plants and on the phylogeny of angiosperms in particular, utilizing evidence from the comparative morphology and life history of living plants, from geographical distribution, and from the structure and chronological succession of fossil forms. The author inclines strongly toward Bower's ideas, but tries to present all sides of the question impartially. The 44 pages devoted to geographical distribution make an excellent compendium of the whole subject, presenting not the actual facts of modern distribution but rather the general nature and dynamics of the subject, basing the whole on the migration of seeds and proceeding to a discussion of endemism, discontinuous distribution, and the age and area hypothesis.

A shorter chapter deals with some of the general principles derived from a study of fossil plants, beginning with the conditions of fossil formation, presenting a general statement of the distribution of plants in time, and discussing in interesting fashion the causes of the extinction of species.

In chapter 12 the fossil seed-bearing ferns are discussed in more detail, particularly the Cycadeoidea, which are accepted by the author as the immediate progenitors of angiosperms, following the views of Arber and others, which are presented in inter-

esting and critical form. Polycotyledony is regarded as more primitive than dicotyledony, in agreement with the recent work of Bucholz, and the monocotyledons are derived from the Ranalian plexus. Due attention is of course given to other theories. The final chapter presents in tabular form the names and classification of the main groups of plants, with the angiosperms placed in practically the Engler and Prantl sequence. A brief bibliography and index occupy the remaining pages.

In general, the book is both interesting and readable. It is modern in including recent developments in botanical science, fair in presenting different controversial views, and satisfactory in inclining to one view while recognizing the claims of others. Unfortunately, typographical errors are frequent.

H. A. Gleason

NEWS ITEMS

Contributors will please note that Mr. Norman Taylor, who has been the editor of Torreya for the last ten years has resigned that position. Mr. George T. Hastings of 7 Robbins Place, Yonkers, N. Y., has been elected editor and all matters relating to Torreya should be sent him.

Dr. and Mrs. N. L. Britton, accompanied by Dr. F. J. Seaver, have sailed for Trinidad where exploration of that island and adjacent regions will be carried on.

TORREYA

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THE WILD FLOWER PRESERVATION IDEA IS ONE OF PRACTICAL VALUE*

By Homer D. House,

State Botanist of New York

Our attention has been directed most pointedly within recent years to the necessity for the conservation of all those natural resources which have to do with the economic life of the state and nation. It is an urgent and pressing need and calls for broad and effective legislation.

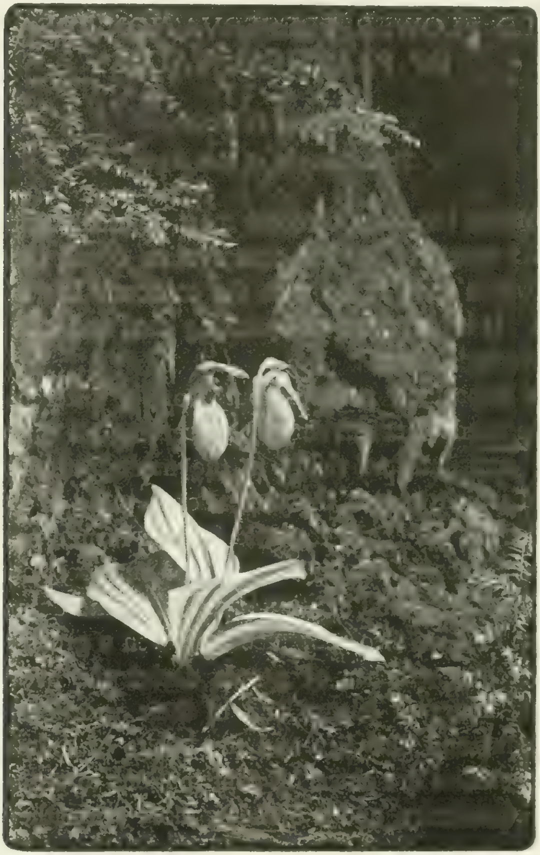
Not less important, perhaps, but from a different point of view, is the need of conserving or preserving all forms of wild life which contribute so richly to the mental stimulus of our people, and which add to the recreational value of our woods, forests and fields; of these, the wild flowers form a not inconsiderable part. To some people the value of our great out-of-doors depends upon fishing and hunting game birds and animals; but it is important that we also recognize that even a greater and constantly increasing number of people derive the greatest value during their hours of leisure and in their vacations from the study of plant and bird life and the habits of animals. Such recreational studies are powerful contributions to peace of mind, happiness, equanimity, and a broader, more sympathetic outlook upon life.

Our vacation playgrounds, whether they are National Parks, State reserves or just plain unprotected wild country have a value that should not be measured in money units, but by their indirect influence upon the lives and activities of those who enjoy the ad-

* Abstract of an illustrated lecture given at a joint meeting of the Torrey Botanical Club and the Wild Flower Preservation Society, at the New York Botanical Garden, May 26, 1920.

vantages for recreation that they afford—and the automobile with the improved highways has opened the door to thousands who never before were able to appreciate the beauties of nature.

This for lack of a better name we may designate as the esthetic



value of nature, and I think few persons will deny that in the long run it works for our good.

There is another aspect of the situation, one which borders on the economic. It is based on the fundamental and well-known fact that all of the elements of nature are closely interwoven and interdependent and that the loss of even a part of one entails the

corresponding loss of the others. It is easier to destroy plant life than any other form of wild life. The result is that the so-called "balance of nature" is seriously disturbed, and that all animals, including the birds dependent for food upon the destroyed plants, and the insects correlated with them, must also disappear—by death or by retreat to regions still primeval. It would take too much space to go into details, but I think that a very direct connection can be traced between the diminishing wild flowers and the scarcity of many desirable species of birds and animals, as well as the unwelcome increase of undesirable forms of insects. The destruction or wholesale gathering of wild flowers disturbs the balance of nature and their place is taken by weeds. There must follow a change in the insect and bird life, and in this readjustment some species of insects, animals and adventive plants become pests, accomplish great damage, and cause the expenditure of large sums of money for control measures.

The automobile is a great factor in our modern life for pleasure and for good, but it is also a great factor in the more rapid destruction of wild flowers, by those thoughtless persons who cannot be satisfied with seeing wild flowers at home in their incomparable surroundings, but needs must uproot, break down and gather them by the armful. The only satisfaction to be gained is a few brief hours of doubtful pleasure which the flowers may yield from bowls and vases. They then go to join the despised contents of the garbage can. Where they formerly grew in the woods, their beauty will not delight the passerby again for many years, perhaps never again in that spot if the destruction was sufficiently complete. By such methods have many of our byways and woodlands, formerly so attractive with their wealth of true Americans, become the abiding place of burdock, thistle, mustard, ragweed, and numerous other obnoxious aliens. Even more regrettable is the fact that the disturbance does not end with the mere change of plant life. The insects, animals and bird life also suffer a marked change, adding nothing to the attractiveness of such byways and woodlands.

Any effort toward the preservation of wild flowers is therefore

also an effort toward the preservation of all wild life, and the value of such efforts toward preservation is both economic and practical.

The diminished numbers of many of our most attractive wild flowers is of course due in large part to the undeniable needs of agriculture. However if we consider the diminishing abundance of attractive wild flowers in the still large areas of woodland and forest remaining in the agricultural areas we realize that there

are other and more important agencies. Chief among those agencies we must place fire. Often accounted as of little importance, occasional or frequent ground fires running through the dried leaves and litter of the woodland floor have been most important in the destruction of plants which are intolerant to fire.

Trailing arbutus, or mayflower, has been especially persecuted by ground fires; its manner of growth makes it almost impossible to gather without pulling it up by the roots and its attractiveness and delicate odor make it much sought after. Considering all these things it is little wonder that the trailing arbutus is now a

very rare plant in many sections of the country where formerly it was common.

The list of wild flowers which have suffered most severely from the overzealous admirers is a long one, but space need be taken to mention only a few of the most important. They are the showy lady's-slipper, the moccasin flower, the rose pogonia, the arethusa, mertensia or blue bells, white water lily, American lotus, and the anemone or wind flower. To this list I am sure almost any lover of wild flowers could make many additions.

Education looking toward the right estimation and preservation of our diminishing forms of wild life ought to be more generally and widely extended, but even at its best probably would not reach many classes of people who are the worst offenders. Meanwhile it seems most desirable that we should use all our efforts in the establishment of national, state and private wild-life reserves, of both large and small size, in all sections of the land, where not alone shall the animal and bird life find safety and refuge but where also the native plant life shall be equally protected.

THE RECEPTACLE OF ACHILLEA MILLEFOLIUM L.

By Mabel L. Merriman

The receptacle of the genus *Achillea* is given as flat or convex in Britton's manual of North American flora. Similarly in Gray's new manual the character of the receptacle is expressed by the word "flattish."

Clusters of *Achillea millefolium* L. brought in for class study in Oct., 1919, exhibited heads either markedly conical or oblong in shape in contrast to the usual flat-topped or slightly convex forms. It was thought at first that the difference in appearance might be due to a lengthening of the tubular flowers in the center of the head. A lengthwise section of the head showed that the receptacle had become much elongated, being narrowed to nearly the width of the stem axis, the section suggesting in its contour

spicate inflorescence. The presence of buds at the apex of the section signifies that such elongation must have preceded flower formation and hence have been an early growth of the meristematic tissue; an evidence of a change in organization rather than an adaptive variation.

The interest awakened by these specimens stimulated further collections in other localities in the fall months of 1920. Plants with conical and oblong heads were collected at various points in Highlands, N. J. These plants were growing in gravelly soil on hillsides at some distance from the beach.

Fig. 1 was drawn to scale from a lengthwise section of a normal head with a flat receptacle. The projection of tubular flowers beyond the marginal ray flowers is less than one mm. in the flat receptacled forms. The external view of a head shown in Fig. 2 and the lengthwise section in Fig. 3 are of an example on another branch of the same plant where the prolongation of the head beyond the involucre was 4 mm. There were from 23 to 27 flowers in these heads while those with the flat receptacles averaged 12 flowers in a head. In all examined it was found that the elongation of the receptacle resulted in an increase of perfect flowers and hence of fruits. It has been shown by various investigators as reviewed by Stout and Boas* in their statistical studies of *Cichorium* that number of flowers per head varies with the position in the inflorescence. With *Achillea* it would appear that the form of the receptacle is a governing factor.

Two weeks later when on a collecting trip in the Edenwald section of the Bronx plants were found possessing receptacles with a much greater elongation. Figs. 4 and 5 are of one from this locality. Expressing the measurements in order of proximity of heads in a corymb, the elongation of the receptacles are as follows in mm.: 7, 7, 7, 6, 6, 8, another 8, 9, 11, 11, 10, 11, 10, 10, 7, 9, in another 10, 9, 10, 10, 11, 11, with six succeeding of 10 mm. Another branch had corymbs with 4 adjoining heads of 10 mm., 7 of 9 mm., with the remaining ones of 8, 8, 9, 9, 8 mm. It is to

* Stout, A. B., and Helene M. Boas, Statistical Studies of Flower Number per Head in *Cichorium intybus* N.—Kinds of Variability, Heredity and Effects of Selection, Mem. Torrey Bot. Club: 17. 334–458, 1918.

be noted that these specimens show not only heads of greater elongation than those previously found but that on the corymbs there are no heads showing intermediate stages and in all the

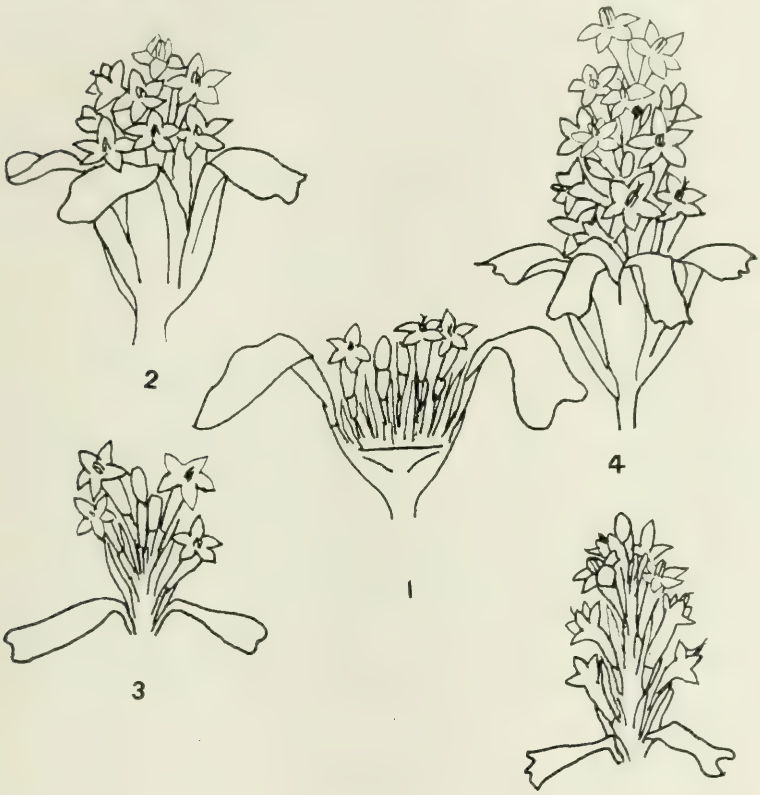


FIG. 1. A lengthwise section of a common form of yarrow with flat-topped receptacle. × 5.

FIGS. 2 AND 3. External view and lengthwise section of a head with an elongated receptacle measuring 4 mm. × 5.

FIGS. 4 AND 5. External view and lengthwise section of a head with an elongated receptacle measuring 7 mm. × 5.

heads there is a tendency in nearby receptacles to show a similar measurement. Another plant with heads similar to that shown in Fig. 4 had ray flowers interspersed with the tubular flowers on the elongated receptacle. These were in addition to the usual number surrounding the head.

The depth of the involucre remained constant for all the forms collected.

The notes here presented are but inadequate observations. They suggest the desirability of conducting genetical studies in this genus which as in the case of the mutating oenotheras consist of forms growing far from their place of origin.

Extensive experiments might solve the problem as to whether in these elongated receptacles we have mutating characters or reversions. The resulting spike-like cluster characteristic of more primitive plants might indicate the latter interpretations as the more probable. Jost states on page 395 of his work on Plant Physiologie:† "New characters, that is mutations, behave the same as reversions."

It is in the genus *Achillea* that we also have the oft-quoted examples of species mutually excluding each other from calcareous and siliciferous soils. Schimper states in Plant Geography,‡ page 105, that *Achillea millefolium* will grow equally well in either kind of soil while *A. moschata* is an inhabitant of siliciferous soil, excluding *A. atrata* which prefers calcareous soils. It would be of interest to determine the lengths of the receptacles of the plants growing in these different kinds of soils and the influence if any of change of soil in modifying the lengths of the receptacle. It is possible also that seasonal conditions may be important factors in the appearance of these interesting plants.

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ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1920

By James C. Nelson

Although the writer did not find it possible to collect very extensively during the past season, the introduction of foreign plants into Western Oregon seems to have gone on unchecked.

† Jost, Ludwig, Lectures on Plant Physiology, 1907, trans. by Gibson.

‡ Schimper, A. F. W., Plant Geography upon a Physiological Basis, 1903, trans. by Fisher.

All of the species listed below were found growing spontaneously with a good chance of persisting, and none of them find mention in Piper & Beattie's Flora of the Northwest Coast, although all were collected within the limits of that manual. These 34 species bring the total number of species not mentioned in the above work, but reported by the writer, to 343.

Species plainly introduced are marked *.

1. *Alisma Plantago-aquatica* L. var. *parviflorum* (Pursh) Torr. Muddy shore of Willamette River, Eugene.
2. *Muhlenbergia squarrosa* (Trin.) Rydb. Muddy shore of Columbia River on Hayden Island, opposite Vancouver, Wash. Not infrequent along the upper Columbia.
3. **Cynosurus echinatus* L. Abundantly established on dry slope of Skinner's Butte, Eugene.
4. **Eragrostis cilianensis* (All.) Link. Sandy river-bank near city dump, Eugene.
5. **Agropyron glaucum* R. & S. In shipyard on old ballast, Linnton, Portland.
6. **Ornithogalum umbellatum* L. An occasional escape to vacant lots and roadsides, Salem.
7. **Allium Cepa* L. Occasional on railroad-embankments near Salem.
8. **Urtica dioica* L. In shipyard on old ballast, Linnton, Portland.
9. **Maclura pomifera* (Raf.) Schneider. Freely escaping from a neglected hedge along roadside near Springfield, Lane Co.
10. **Rumex cuneifolius* Campd. In shipyard on old ballast, Linnton, Portland. A Patagonian species.
11. **Atriplex rosea* L. Sandy waste ground on river-shore. Lower Albina, Portland. Previously reported by Suksdorf.
12. **Amaranthus paniculatus* L. Waste ground at old city dump, Salem. Occasional in cultivation.
13. **Corrigiola littoralis* L. Abundant in dry gravelly soil in railroad-yards, Lower Albina, Portland. Previously collected by Suksdorf.

14. **Raphanus Raphanistrum* L. var. *purpureus* (Reichenb.) Domin. Growing with the species along railroad-tracks in State Fair Grounds, Salem.
15. **Erysimum repandum* L. Along railroad-tracks, Lower Albina, Portland; and in similar situations at Salem.
16. **Lepidium densiflorum* Schrad. var. *pubecarpum* (A. Nels.) Thellung. Waste ground in railroad-yards, Lower Albina, Portland. Probably introduced from Rocky Mountain region.
17. **Conringia orientalis* (L.) Dumort. With the last, and also along railroad-tracks near Salem.
18. **Roripa Armoracia* (L.) Hitchc. A frequent escape to vacant lots and waste ground in Salem.
19. **Rubus pubescens* Weihe. On a dry shaly bank along the Oregon Electric Railroad at Salem.
20. **Medicago minima* L. In shipyard on old ballast, Linnton, Portland.
21. **Erodium aethiopicum* (Lam.) Brumhard & Thellung. Waste ground in rear of cannery, Salem.
22. **Oxalis corniculata* L. Under rose-bushes on street-parking, Salem.
23. **Hibiscus Trionum* L. In a vegetable-garden, Salem.
24. **Lycopersicum esculentum* L. Frequent in waste places, and occasional on sand-bars along the Willamette River, Salem.
25. **Physalis ixocarpa* Brot. Sandy waste ground in railroad-yards, Lower Albina, Portland. Not found in cultivation.
26. **Mazus rugosus* Lour. Muddy shore of Columbia River on Hayden Island, opposite Vancouver, Wash. Previously collected by Gorman at border of pond in Kenton, Portland. A native of tropical east Asia.
27. *Mimulus floribundus* Lindl. Muddy shore of the Columbia River on Hayden Island, opposite Vancouver, Wash. Noteworthy so near sea-level.
28. *Pentstemon deustus* Dougl. Gravelly shore of the Willamette River, Eugene. Common southward and in eastern Oregon.

29. *Ilysanthes inaequalis* (Walt.) Pennell. On muddy shores of the Willamette River, Salem. Perhaps has been mistaken for *I. dubia* (L.) Barnh.
30. **Orobanche minor* Sm. In shipyard on old ballast, Linnton, Portland.
31. **Rubia tinctorum* L. On street-parking, Salem. Nowhere found in cultivation.
32. **Lonicera Xylosteum* L. Along railroad-track at Mute School, Salem.
33. **Solidago serotina* Ait. var. *gigantea* (Ait.) Gray. Waste ground at old city dump, Salem. A native of the eastern U. S., and frequent here in cultivation.
34. **Centaurea Jacea* L. var. *lacera* Koch. Dry roadside in river-bottom near Orville, Marion Co.

I am again under obligation to Mr. J. F. Macbride for his unwearying kindness in verifying and correcting these determinations. Specimens of all the above have been deposited in the Gray Herbarium, and also in the herbarium of the Philadelphia Academy of Science (naturalized species only).

Mr. S. B. Parish's exhaustive study of the Immigrant Plants of Southern California (Bull. S. Cal. Acad. Sci. 19: Part 4, 3–30. Oct. 1920) affords an interesting contrast between the weed-floras of the two neighboring States. He includes in his list 290 species, and appears to have thoroughly covered his territory; whereas in Western Oregon north of the Umpqua Valley something over 450 introduced species have been reported—and the end is not yet! While the warmer winters of Southern California permit a number of sub-tropical species to gain a foothold that would be unable to survive in Oregon, this advantage is more than offset by the greater aridity of the Californian summer. The climate of Western Oregon is in this respect more nearly like that of Western Europe, and the immigrants from that very weedy region therefore find summer conditions more favorable here than further south, while they escape the severe winters of the Atlantic seaboard. If our Oregon rainfall could be distributed so as to give us a few more inches of precipitation in

the summer months, we might easily become the weed-paradise of the world, and a convincing example of the results of unrestricted immigration!

THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND AND GARDINER'S IELAND

By Steward H. Burnham and Roy A. Latham

(*Continued from January–February* Torreya)

SPERMATOPHYTA

Picea rubens Sarg.—On Gid's Island, July 24, 1920 (Dr. C. S. Gager, N. Taylor & R. Latham). This island does not cover over three acres and is entirely surrounded by salt marshes. Two of the four trees are dead and the other two more than half dead: but there are four little seedlings ten to twenty inches high. Mr. Taylor remarks that these are evidently the last remains of what was once a spruce forest covering the whole island and that they are putting up a losing fight.

Pinus Strobus L.—A colony of nearly 300 trees in a swamp at Greenport; some of the trees actually growing where their roots are submerged a portion of the year. November 1918. Mr. Price, an elderly gentleman, who owns the swamp, says his father told him that they were a true native here. Some of the trees are probably 100 years old. There are eleven trees in dry woods at Southold which may be native. During August 1920 several hundred trees were seen in dry wood-lands at Bay View.

Sparganium androcladon (Engelm.) Morong—Wet place, Gardiner's Island. No. 3433. Sept. 20, 1920.

Potamogeton diversifolius Raf.—In a pond on Gardiner's Island. No. 3427.

**Agrostis altissima* (Walt.) Tuck.—Low marshy ground, rare at Mattituck.

A. perennans (Walt.) Tuck.—Dry soil throughout the town.

Aristida tuberculosa Nutt.—Rare along the railroad track in ashes at Laurel in the western part of the town. It is abundant in sandy soil a few miles further west but outside the town of Southold.

Calamagrostis cinnoides (Muhl.) Scribn.—Not common in low open ground at Mattituck.

Festuca Myuros L.—Wet sandy soil at Mattituck.

F. rubra L.—Orient in rather dry open woods near a salt marsh.

Miscanthus sinensis Anderss.—Occasionally found in waste places and old yards.

Panicularia obtusa (Muhl.) Ktze.—Mattituck in a swamp.

* The grasses were named by Mrs. Agnes Chase of the U. S. Department of Agriculture.

Panicum meridionale Ashe—In dry woods at Cutchogue; determined as *Panicum albemarlense* Ashe.

P. tennesseense Ashe—Southold in sandy soil.

Carex atlantica Bailey—Wet woods at Greenport and Orient; determined by Mr. G. P. Van Eseltine. No. 2285.

C. festucacea Schkr.—Wet open place in woods at Greenport (No. 3518) and at Southold (No. 3530).

Carex laevivaginata (Küken.) Mackenzie—Greenport in wet woods; determined by Mr. Van Eseltine. No. 2288.

C. lanuginosa Mx.—Greenport in a swamp and Orient in wet sandy woods; determined by Mr. Van Eseltine. No. 2339.

C. laxiculmis Schwein.—Frequent in dry open woods at Southold. No. 3524.

C. Swanii (Fernald) Mackenzie—Orient. No. 1101.

Cyperus dentatus Torr.—Wet sandy shores at Laurel. No. 1278 and 3447.

Eleocharis acicularis (L.) R. & S.—Salt marsh, Gardiner's Island (No. 3432) and sandy shore of a pond at Laurel (No. 3469).

Eriophorum virginicum L.—Laurel. No. 1287. Aug. 4, 1918.

Rynchospora alba (L.) Vahl—Laurel. No. 1291.

Spirodela polyrhiza (L.) Schleid.—East Marion (No. 3533) and Greenport. Locally common on woodland pools and ponds: at Greenport abundantly associated with *Lemna minor* L.

Juncus aristulatus Mx.—Growing in large clumps in a brackish marsh at Orient. Rare. May 30. 1917. No. 1087.

J. tenuis Willd.—Dry hills, Gardiner's Island. July 14, 1918. No. 1260.

Aletris farinosa L.—Laurel. Sept. 10, 1917. No. 1077.

Lilium philadelphicum L.—Open ground between Southold and Great Pond at Peconic. A colony of about 50 plants.

Gymnadeniopsis clavellata (Mx.) Rydb.—Boggy woods at Mattituck. Aug. 28, 1920. No. 3460.

Ibidium gracile (Bigel.) House—Plants having a single stout root were found in dry open ground at Southold. Aug. 20, 1920. No. 3434.

Hicoria ovata (Mill.) Britton—Low woods, Gardiner's Island. No. 3422. Sept. 20, 1920.

Myrica Gale L.—Laurel. Aug. 4, 1918. No. 1288.

Populus heterophylla L.—Greenport in swampy woods. July 25, 1920. The first time Mr. Taylor has seen it wild on Long Island.

Salix Bebbiana Sarg.—Greenport in dry open places. Plants commonly two feet high or less were found on sandy dunes at Southold.

S. cordata Muhl.—In a swamp at Mattituck. June 18, 1920. No. 3521. The leaves little narrower than usual.

S. discolor Muhl.—The var. *eriocephala* (Mx.) Anders. In open places at Greenport (Wm. C. Ferguson); determined by Dr. P. A. Rydberg.

Quercus ilicifolia Wang.—Rare near Laurel in light soil. No. 1268. Aug. 4, 1918. A single plant at Cutchogue; which is the easternmost record for it. The scrub oak becomes abundant about eight miles west of the Southold town limits.

Q. prinoides Willd.—Southold. Sept. 10, 1919. Rare in dry woods at Mattituck and Peconic.

Ulmus fulva Mx.—Wet woods at Greenport. July 20, 1920. No. 3459. Very rare in low woods; several trees in a bunch, which came from the stump of a large tree, cut many years ago.

Morus rubra L.—Was listed previously as probably introduced; but now found to be a native on Gardiner's Island.

Boehmeria Drummondiana Weddell—Laurel. Sept. 10, 1917. No. 1280.

Persicaria opelousiana (Riddell) Small—Swampy woods at Greenport. Aug. 28, 1920. No. 3386.

P. orientalis (L.) Spach.—Occasional in waste grounds and cultivated fields at Greenport and Orient.

Polygonum atlanticum (Robins.) Bickn.—Large bushy plants on sea beaches at Orient, Aug. 20, 1920. No. 3396.

Rumex mexicanus Meisn.—Orient. June 1916. Specimens previously reported as *Rumex pallidus* Bigel. should probably be referred here.

Acnida cannabina L.—Salt marshes at Laurel. Sept. 14, 1918. No. 1313. Specimens previously reported as *Acnida tuberculata* Moq. should probably be referred here.

Chenopodium Botrys L.—Southold (Mrs. F. R. Mitchell); determined by Mr. Taylor.

C. rubrum L.—Beach at Southold (Mrs. Mitchell); determined by Mr. Taylor.

Allionia nyctaginea Mx.—The subspecies *Allionia nyctaginea ovata* (Pursh) Morong. Moist waste ground at Laurel. Sept. 14, 1918. No. 1318.

Cerastium arvense L.—Fields at Southold (Mrs. Mitchell).

Silene stellata (L.) Ait.—Moist woods at Southold. Oct. 19, 1919. No. 4071.

Magnolia tripetala L.—A single tree twenty feet high with trunk diameter of five inches, at the edge of wet woods at Southold. The origin is uncertain, but introduced. Reported to Mr. Latham by Mrs. Mitchell. Oct. 16, 1919. No. 2148.

Cardamine hirsuta L.—Old lawn at Southold (Mrs. Mitchell).

Draba caroliniana Walt.—Sandy soil at western end of Long Beach at Orient. Rare. 23 May–early June, 1920.

Sarracenia purpurea L.—A single plant from a bog near Mattituck.

Agrimonia Bicknellii (Kearney) Rydb.—Rare in dry woods at Southold (Ferguson & Latham); determined by Dr. Rydberg.

A. rostellata Wallr.—Uncommon in dry woodlands at Southold. Oct. 10, 1919. No. 2120.

Potentilla recta L.—Dry roadsides at East Marion. Rare. June 20, 1920. No. 3531.

Amelanchier oblongifolia (T. & G.) Roem.—Not uncommon in dry woods at Cutchogue; determined by Dr. K. M. Wiegand. No. 3407.

Crataegus Arnoldiana Sarg.—Gardiner's Island, frequent at margins of woods in dry or wet soil; determined by Mr. W. W. Eggleston. A thick foliaged, beautiful, round-topped tree about twenty feet high.

Crataegus intricata Lange.—Gardiner's Island; determined by Mr. W. W. Eggleston.

Crataegus intricata Lange.—Gardiner's Island; determined by Mr. W. W Eggleston.

Chamaecrista nictitans (L.) Moench.—Bay View and Southold, locally common. Sept. 1920. No. 3403.

Crotalaria sagittalis L.—Common on a dry sandy ridge at Southold. Aug. 28, 1920. No. 3385.

Lathyrus latifolius L.—A rare escape in dry woods in the vicinity of an old house-site at Cutchogue. Aug. 21, 1920. No. 3399.

Meibomia obtusa (Muhl.) Vahl—Dry hillside, locally common at Southold. Aug. 29, 1920. No. 3395.

M. rigida (L.) Ktze.—Mattituck. Aug. 9, 1918. No. 1284.

Polygala Nuttallii T. & G.—Mattituck. Aug. 9, 1918. No. 1267.

Tithymelus Helioscopia (L.) Hill—Rare in a field at Peconic (Mrs. Smith). Dec. 10, 1920.

T. Ipecacuanhae (L.) Small—Sandy soil at Laurel. Aug. 4, 1918.

Staphylea trifolia L.—Rocky woods, Southold; determined by Mr. Taylor. Aug. 1, 1920. No. 3548.

Hudsonia ericoides L.—Common in one locality at Bay View. Aug. 21, 1920. No. 3400.

Rotala ramosior (L.) Koehne—A small colony in wet sand north of Great Pond, Southold. Oct. 19, 1919. No. 2126.

Myriophyllum humile (Raf.) Morong—Gardiner's Island in a pond. Sept. 20, 1920. No. 3426.

Cicuta bulbifera L.—Mattituck. Aug. 9, 1918. No. 1270.

Cornus Amomum Mill.—Uncommon in rich woods at East Marion (Miss Mabel R. Wiggins); verified by Mr. Taylor.

Chamaedaphne calyculata (L.) Moench—Laurel. Aug. 4, 1918. No. 1269.

Eubotrys racemosa (L.) Nutt.—Wet woods at Southold. Oct. 19, 1919. No. 4068.

Gaulthera procumbens L.—Mattituck.

Neopieris mariana (L.) Britton—Low place in woods at Southold. Sept. 14, 1919. No. 2263. Cutchogue in rich woods. Rare on Fleets Neck, Cutchogue but frequent on Nassau Point.

Gaylussacia frondosa (L.) T. & G.—Dry woods at Mattituck. Aug. 21, 1920. No. 3405.

Asclepias exaltata (L.) Muhl.—Rare in wet woods at Southold, south of Great Pond. July 30, 1920. No. 3565.

Phlox subulata L.—Escaped in old yards at Orient. Sept. 10, 1920. No. 3428.

Lithospermum arvense L.—Field at Southold (Mrs. Mitchell); determined at U. S. Dept. of Agriculture. Dry cultivated field at Bay View. May 1, 1919. No. 2158.

Onosmodium virginianum (L.) DC.—Dry or moist woods at Fleets Neck at Cutchogue. Sept. 14, 1919. No. 2246.

Cunila origanoides (L.) Britton—Very rare in oak woods on Fleets Neck at Cutchogue. Sept. 14, 1919. No. 2262.

Koellia flexuosa (Walt.) MacM.—Dry open woods on Gardiner's Island. Sept. 20, 1920. No. 3424.

K. incana (L.) Ktze.—Common in dry hilly woods at Southold. Oct. 19, 1919. No. 1909.

K. mutica (Mx.) Britton—Dry woods at Southold. Sept. 21, 1919. No. 4052.

Leonurus Cardiaca L.—Waste places at Bay View. Aug. 21, 1920. No. 3413.

Lycopus rubellus Moench—Greenport and Southold in low woods, frequent.

Mentha piperita L.—Roadside at Cuchogue. Oct. 14, 1919. No. 4045.

Stachys hyssopifolia Mx.—Gardiner's Island. July 14, 1918. No. 1258.

Physalis heterophylla Nees—Locally common as a weed in light cultivated soil at Cutchogue. Oct. 4, 1919. No. 4047.

Pentstemon digitalis (Sweet) Nutt.—Rare in dry ground at Southold. Aug. 28, 1920. No. 3384.

Utricularia macrorhiza LeConte—Laurel. Sept. 10, 1917. (*Utricularia vulgaris* of Am. Auth.)

Galium Mollugo L.—Orient. July 15, 1918. No. 125.

G. verum L.—Field at Southold (Mrs. Mitchell).

Viburnum cassinoides L.—Laurel. Sept. 14, 1918. No. 1316. Rich woods at Greenport. Oct. 30, 1920. No. 3451.

Cucurbita Pepo L.—Several specimens growing wild on sand dunes at Southold. Not an uncommon escape on farms and in waste places.

Micrampelis lobata (Mx.) Greene—Orient. Sept. 1, 1918. No. 1310.

Sicyos angulatus L.—Rare in waste places at Greenport.

Hieracium aurantiacum L.—Rich soil along old road in woods at Southold. Sept. 29, 1920. No. 3465.

H. marianum Willd.—Dry soil at Southold (Mrs. Mitchell).

Lactuca canadensis L.—The var. *integrifolia* (Bigel.) Gray in dry woods at Cutchogue (No. 3398), Aug. 15, 1920; and Orient (No. 1335), Sept. 30, 1918. This includes the previously reported *L. canadensis* v. *montana* Britton and *Lactuca sagittifolia* Ell.

Lactuca Scariola L.—Dry woods at Bay View. Sept. 5, 1920. No. 3436. Also the var. *integrata* Gren. & Godr. in sandy places at Orient. Sept. 15, 1920. No. 3418.

Nabalus trifoliolatus Cass., var. **obovatus** var. nov. Leaves purplish, membranous, obovate or oblanceolate, or deltoid, acute, on margined petioles, slightly denticulate or entire. Moist woods at Orient. Oct. 1919. No. 3375. Plants with deltoid leaves were found in dry ground at Bay View. Aug. 29, 1920. No. 3446.

Aster laevis L.—The var. *amplifolius* Porter is rare along wet margins of woods at Orient. Oct. 11, 1919. No. 2201.

A. Lowrieanus Porter—Uncommon in rich woodlands at Greenport and Orient (Mr. Ferguson); verified at the N. Y. Bot. Garden.

A. vimineus Lam.—Dry or wet soil in fields at Gardiner's Island. Sept. 19, 1920. No. 3421.

Centaurea maculosa Lam.—Dry fields at Cutchogue. Oct. 19, 1919. No. 2111.

C. nigra L.—The var. *radiata* DC. in dry pastures at Cutchogue. Oct. 19, 1919. No. 2110.

C. solstitialis L.—Field at Southold (Mrs. Mitchell); determined at U. S. Dept. of Agriculture.

Cirsium muticum Mx.—Gardiner's Island in wet woods. Sept. 20, 1920. No. 3429.

Lacinaria scariosa (L.) Hill.—A single plant in dry woods at Fleets Neck, Cutchogue. Sept. 14, 1919. No. 2245.
Solidago ulmifolia Muhl.—Dry hillside at Southold. Sept. 1, 1920. No. 3394.

BOOK REVIEW

Hardy's Geography of Plants*

The author of this comparatively short volume has dared much in attempting to write a brief account of the plant geography of the earth. In most works devoted to the subject authors are usually content to describe the different plant societies, such as forests, grasslands, and the like and mention a few well-known examples of each in the different countries. Schimper's monumental book on plant geography is built on this plan, but the author of the book under review boldly adopts the more interesting, if somewhat hazardous, method of taking the different continents one at a time and briefly describing the vegetation of each.

It is obviously impossible to give in a short review the scope of the book, for to do so would involve useless repetition of material from the book itself, and it were better for the prospective reader to go directly to the source. No other book in English comes within measurable distance of doing so well what it attempts to do. For here both the botanist and intelligent layman will find in plain English a readable account of the vegetation of the different parts of the earth.

So far as our own continent is concerned the treatment is all that one could expect in a book admittedly general in its scope. The different forest and grassland and desert regions of the continent are dealt with in some detail, but the chief value of the book is that it gives to those who will not or often cannot take the time to study more special works, a clear, readable, and judging by the account of our own vegetation, a reasonably accurate description of the vegetation of the earth. No specialist will go to such a book for his information, but the general botanical reader may be congratulated upon having in it the best short account of the subject that has appeared.

Norman Taylor

* Hardy, M. E. The geography of plants. Pp. 1–327. Oxford University Press, 1920. Price $3.00.

NEW SPECIES OF SOUTH AMERICAN PLANTS*

By Francis W. Pennell

Since 1893, Professor Henry H. Rusby has been publishing descriptions of new species of South American plants. It has been Dr. Rusby's good fortune to collect in Chile, Bolivia, Brazil, Venezuela and Colombia, and to have had the privilege of studying the collections of Mandon, Bang, Williams and Buchtien, from Bolivia and of Herbert H. Smith from Colombia.

Before setting out with the reviewer upon their joint expedition in 1917 to central Colombia, it had been Dr. Rusby's wish to complete the study of the older collections which had been accumulating under his care. The present paper is the deferred accomplishment of this and lays before us 292 new species, 172 from Colombia, 85 from Bolivia, 29 from Venezuela, 3 each from Peru and Brazil. The Colombian species are nearly all from the Smith collection made in the Department of Magdalena, only one, and that entered with doubt, being from our own trip. The Bolivian species are mostly of Buchtien's, Bang's and Williams' collecting, the describer's own plants having been long ago studied. But the Venezuela species are from the expedition of Rusby and Squires in 1896, one which has heretofore been too little cited.

The descriptions appear ample, and specimens are uniformly cited, rarely more than one to a species, thus rendering of small importance the rarity of the use of the word "type." In five instances however species are named for collectors other than those whose specimens have been fully listed and apparently used for description, so that the reader is left in doubt as to which plant should be counted type. The study is attractively presented, on good paper and in clear type, and such a venture, at the author's own expense, deserves more than a passing regard.

At its close the paper contains an index to the genera under which South American species are described in this and all the

* H. H. Rusby, Descriptions of Three Hundred New Species of South American Plants, pp. 1–170, Dec. 20, 1920. Published by the author, 115 W. 68th St., New York City. $2.50

previously published papers by the same author. Thus this paper concludes definitely the past period of Dr. Rusby's activity, and we look forward to the new specimens and the new observations to be brought us from his projected extensive South American journey of 1921.

PROCEEDINGS OF THE CLUB

The meeting of May 11 was held at the American Museum of Natural History.

J. C. Nelson was elected to membership.

The special program of the evening consisted of an illustrated lecture on Dahlias by Dr. Marshall A. Howe. The speaker sketched the early history of the dahlia referring to its introduction into Europe from Mexico in 1789. A series of lantern slides showed dahlias in their native haunts in Mexico and Guatamala and numerous modern varieties under cultivation at the New York Botanical Garden and elsewhere. The best methods of cultivation and propagation were discussed. The main substance of the discussion may be found in an article published by the speaker in the Journal of the Horticultural Society of New York for February, 1919.

Meeting of May 26

The meeting was held at the Morphological Laboratory of the New York Botanical Garden.

The following were elected to membership in the club: Ira W. Clokey, Frederick Dawson, George A. King, Miss Dorothy Oak, and Charles P. Smith.

The secretary announced the death on April 23 of Miss Mary S. Andrews, a member of the club, and read the following article of her will: "I give and bequeath unto the Torrey Botanical Club, a corporation organized and existing under the laws of the state of New York, the sum of one thousand dollars ($1,000) to be used by it in such research work as from time to time shall seem advisable to a majority of the then board of trustees of the Club."

The first part of the scientific program was by Dr. John K. Small, "Notes on a Recent Trip to Florida." The second item of the program was a preliminary report of a trip to Trinidad by Dr. N. L. Britton, illustrated by interesting specimens, including the fruits of various tropical trees, shubs and vines and a series of fossil leaves from a bed of plant remains sixty feet thick. Dr. Liberty Hyde Bailey then gave an entertaining and instructive account of his recent experiences in travelling and botanizing in China.

Meeting of October 12

The meeting was held in the botanical laboratory of Schermerhorn Hall, Columbia University.

The following were elected to membership: Miss Eliza Frances Andrews, Prof. Forman T. McLean, H. Nordheim, G. G. Orphal. H. E. Piaget, Dr. W. A. Setchell, Wilhelm Suksdorf, Raymond H. Torrey, Mrs. Arthur E. Sproul.

The evening's program consisted of short reports by members of their botanical experiences during the summer. Prof. R. A. Harper spoke of his experiments in growing various sorts of maize. Dr. J. A. Harris told of his explorations in Utah and of the study of the osmotic concentration of cell-sap of desert plants. Dr. Michael Levine had continued his investigations of crown-gall, this year obtaining interesting results with beets. Dr. B. O. Dodge told of his culture of various parasitic fungi, and Mr. Alexander Gershoy of his studies of cleistogamy in violets. Dr. Alfred Gundersen had been in the Catskills and noted the contrast in vegetation on different slopes. The president of the club had been in Bermuda, and the secretary in Texas and the Pocono region of Pennsylvania. The fullest report was by Dr. T. E. Hazen. In the spring he was with Dr. Britton's party in Trinidad, but he told us chiefly of his visit during the summer to northern Europe, especially to Norway. Two of his most unexpected results were the obtaining of the organism causing "red snow" in Norway and the discovery of a new and interesting species of the same family in the vicinity of London.

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THE PHYLLOTAXY OF PHOENIX CANARIENSIS

By Cornelius Beach Bradley

Date palms of this species are frequently grown as ornamental trees in and about Berkeley, California. They are mostly young trees that are approaching maturity or have recently attained it. As the leaves grow old and bend low toward the ground, they are generally lopped off to get them out of the way, leaving the stumps however in place on the trunk. Since these stumps persist for years, they build up in time an authentic record of the development and arrangement of the leaves, complete save where accident or decay has marred it, and save also that it does not include the earliest period of growth; for through the enormous expansion of the trunk during that stage, all the earliest leaves are torn from their attachments and lost long before the regular trimming of the leaves begins. This record of the leaf-stumps was found to be of very great assistance in working out the phyllotaxy of the tree, and is frequently cited as "the record" in the discussion which follows.

I

1. A preliminary survey made it evident that the problem here presented is not by any means the simple one usually encountered in a study of this kind, namely, the deciphering of a single and a stable pattern, and the identification of it with one of the "regular" patterns described in the textbooks. On the contrary, all the ordinary clues were here completely lost in a maze of uncertainty caused by constant change of pattern. Only at a single point between infancy and maturity was there a pause where the wheeling ranks stood still long enough to be counted. Never before had the writer encountered anything of this sort, nor from

his early reading of the authorities could he recall so much as a suggestion that such things ever occur.* Here then was a challenge which could not be ignored or neglected.

2. After careful examination of many specimens it became clear that each tree of this species has passed through several distinct phases of phyllotaxy, namely: (1) The initial pattern of infancy, not included in the record, and at this stage not yet identified, but later found to be of the 5-ranked pattern (cf. Chart, Zone I). (2) At an uncertain distance above this the record begins in the midst of a zone of no recognizable pattern whatever, because it offers no vertical alignments to form the basis of a numbered scheme (cf. Chart, Zone II). (3) Near the upper edge of this zone, out of what is apparently mere confusion, there presently emerges a recognizable group of oblique spiral ranks which, curving sharply upward, presently reach verticality. There are thirteen of these ranks—so now we know where we stand, though not as yet just how we got there (cf. Chart, Zone III). (4) This vertical alignment sometimes continues unchanged through a space of several feet. Quite as frequently, however, the thirteen ranks merely touch verticality and then gradually swerve away from it. But in either case they do not lose themselves in confusion like that from which they emerged at first.* For here the 13-ranked pattern in its entirety is visibly carried forward along these curves without dislocation or change, save that the whole is slightly tilted in conformity with their deflection (cf. Chart, Zone IV). (5) This gradual rotation of the pat-

* In the writer's student days the botanical authorities within his reach had very little to say concerning deviations from the regular series of leaf-patterns except as the deviations were the result of seasonal changes in the growth of the plant, or of modification of leaves to subserve new functions. Since then it has not been possible for him to follow up the later developments of phyllotactic theory. While acknowledging the seriousness of this handicap for the present task, he still ventures to think that in one way this may not have been wholly a disadvantage—it has at least left him free from theoretical bias to deal with the facts as he found them.

* This double curve of the 13's, with its two arms meeting in Zone III, is the most noticeable feature of the whole record and a valuable landmark for the investigator. Its curvature is always convex toward the direction of the primary spiral. (Cf. Section III, 3 *infra*.

tern presently brings into play a new alignment of thirty-four vertical ranks, forming a pattern familiar to Californians in the cones of *Pinus Sabiniana* and *P. Jeffreyi* (cf. Chart, Zone V). For a long time no further change was discovered beyond this point.

3. The appearance of fruit at this stage marks the attainment of maturity, and since during this portion of the study no indication of further change appeared, it was tentatively assumed that the 34-ranked pattern was final. Not until after the study was supposedly complete and the paper was actually in the Editor's hands, did the writer discover that in a few older trees the bending to one side of the thirteen ranks is carried beyond the point at which the 34-ranked alignment becomes vertical, being continued in some instances until the 55-ranked scheme is passed, and the 21-ranked scheme is reached. Whether this is or is not the final scheme, cannot yet be affirmed. Meantime it has not been thought necessary to reconstruct the Chart or to discuss the matter further here.

II

Thus in the phyllotaxy of this tree there are seen to be at least five distinct phases, namely: three of well-known "regular" patterns, while two different groupings of leaves showing none of the recognized alignments occupy the intervals between them. Leaf-development, however, is perfectly continuous throughout the whole series; nowhere is there node or break of any sort. Each of the undescribed arrangements grows directly out of the pattern below it, and grows directly into the pattern above it. Obviously these are organic transformations. What is the essential factor in the process, and how does it work out these changes?

1. In all these patterns, regular and irregular alike, four elements are absolutely constant, namely: (*a*) The primary spiral of growth; (*b*) its direction, left or right; (*c*) the axis about which it coils; and (*d*) its division into equal parts by applying to it a constant unit of measurement, namely, the circumferential arc of 360 degrees, or one turn about the axis. The only other

element in the whole system is the leaf-interval, or rather the interfoliar arc; for it is not a linear dimension measurable on the surface, but an arc measured by the angle at the center. This arc thus becomes a second unit of measurement applied to the primary spiral along with the other. When these two arcs are commensurable, by virtue of their coincidence at regular intervals, they gradually build up those systems of vertical ranks by which we recognize the "regular" patterns. Each of these has its own dimensions of arc, and only so long as the dimension remains constant is the pattern identifiable.

2. Our transition zones then are areas in which gradual change in the interfoliar arc operates to rearrange one of the regular patterns, building up out of it the transitional formation, and out of that again the next regular pattern of the series. What at first seemed to be mere disorder and confusion, turns out to be a marvel of order and symmetry when once its method and structure are understood.

3. Let us assume that the primary spiral is a right-hand one like that in the chart. Any increase of the leaf-interval will set each successive leaf a little beyond—*i.e.,* to the right of—the place where it would otherwise have been. If the increase continues, it will presently cause the vertical ranks of the pattern to swerve visibly to the right—toward the direction of the primary spiral. On the other hand, any diminution of the interval will set each successive leaf a little behind—to the left—of what would otherwise have been its place; and the vertical ranks will then swerve to the left, or away from the primary spiral. In either case all the other alignments of the pattern will be similarly affected, though in less degree the further they are removed from verticality. The whole pattern thus undergoes a sort of rotation to right or to left as the case may be; and this, if continued, will gradually swing into verticality some one or other of the ranks which were secondary spirals of the original pattern. Whenever the predestined secondary rank thus becomes vertical, further change in the leaf-interval is brought to an end as we have seen, and the transformation is complete. The whole proc-

ess may be followed in detail in sections II and IV of the Chart. If the primary spiral were a left-hand one, all of these features would of course be reversed.

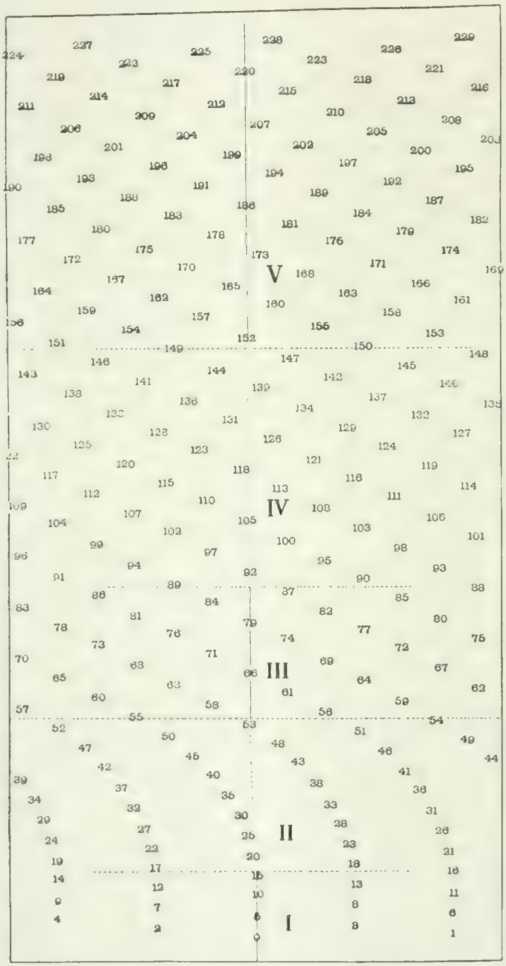
4. The actual amount of change in the interfoliar arc required in order to accomplish these transformations is astonishingly small. The dimensions of the arcs of the three regular patterns with which we are here concerned are given—as fractions of the circumference—in the very formulas by which we distinguish them, namely, $2/5$, $5/13$, and $13/34$. The change required to accomplish the first transition is therefore the difference between the first and second of these fractions; and to accomplish the second, the difference between the second and third. Reduced to decimal form these fractions become 0.400, 0.3846, and 0.3823; and the differences are 0.0154 and 0.0023—the latter amounting only to three fourth of a degree of arc, or one seventh of the minute-interval on the face of a watch. Yet this infinitesimal quantity must be subdivided and distributed over perhaps half a hundred leaf-intervals! *De minimis curat Natura.*

It may seem difficult to account for decrease in the interfoliar arc while the girth of the tree is rapidly increasing. But greater girth simply means larger surface for the insertion of more leaves; and in the case of an endogenous and branchless tree like our palm, it is imperative that no space be wasted—that the growing leaves be crowded together as closely as they can be made to stand. Such being the case, so long as increase in girth keeps ahead of the demand for foot-space for larger leaves, the record will indicate that fact in a changing pattern; because even a constant space on an increasing circumference subtends a diminishing angle at the center. If demand for foot-space catches up with increase of girth, that fact will appear as a pause in the shifting ranks. If increase again gets ahead, change will begin again. If finally equilibrium is established, the pattern reached at that point becomes permanent, and with it the interfoliar arc. Such in brief seems to be the explanation of the strange metamorphoses we have been watching.*

*Among later theories concerning changes in leaf-patterns to which the writer's attention has been kindly directed by the editor of TORREYA, the one

III

The actual sequence of the various parts of this study can perhaps be best understood by following a brief detail of the construction of the Chart.



1. After drawing throughout the field of the Chart the lines of a right-hand primary spiral as the basis of further operations.

which most nearly approximates in its calculated results to the scheme actually presented in our Phoenix is Weisse's Mechanical Theory of Transition, in Goebel's Organography of Plants, translated by Balfour, 1900, Vol. I, p. 74 *ff*.

the thirty-four vertical ranks and the right- and left-hand secondaries of Zone V were plotted at the top. Below this—but with a gap between left for the as yet undeciphered transition—there was made a similar plot of the thirteen-ranked Zone III. These were the only portions of the record so far positively identified and understood. All else was uncertain.

2. The bridge between these two was obviously the next thing to attack. For not only were both its abutments already in place, but the whole record of its construction was there in plain view on the trunk of almost every adult tree of its kind, though as yet we could not read it. All attempts however to devise a scheme which should result in a pattern at all like that of the record were unavailing, until at last the significance of the increasing pitch of the 13-ranked secondaries as they curve downward from Zone V was apprehended.* They curve in order to meet and merge themselves tangentially in the vertical ranks of Zone III. After that it was not difficult to discover the right curve and to plot the girders which were to connect the abutments of the bridge. Leaf-stations then were marked throughout the three zones, and lines of provisional numbering were established as basis for the final numbering of the whole when the plot of Zones I and II should be completed. Thus plotted, the result was not only intelligible, but—what was far more important—it actually represented what was seen in the record of the tree.

3. There still remained Zones I and II. By this time it had been ascertained that the leaf-pattern of the first is 5-ranked, and that it lasts but a very short time before passing into the transition of Zone II. So a narrow zone of that pattern was plotted at a suitable distance below Zone III, and the transition was accomplished precisely as it was in Zone IV above—by bringing down the 5-ranked secondaries of III on a curve which finally merged them in the verticals of Zone I. Leaf-stations were then plotted throughout these two areas, and permanent numbering was established throughout the Chart.

4. The reader of course will not imagine that the broad open

* See in Plate I the descending curve between Nos. 190 and 112, and in Plate II between Nos. 148 and 96.

spaces of the lower portion of the Chart represent at all what would be actually seen on the stem of the infant tree. At the beginning of its growth the five ascending leaf-ranks, instead of being widely separated as shown in the Chart, stand in actual contact about the slender stem—and continue so throughout the life of the tree. The problem of the Chart, however, is not one of dimension, but of alignment; and for that, Mercator's projection has the great advantage of representing all lines of *constant* direction as *straight* lines on a plane surface, and not as conical or conoidal spirals, which all of them save the verticals actually are.

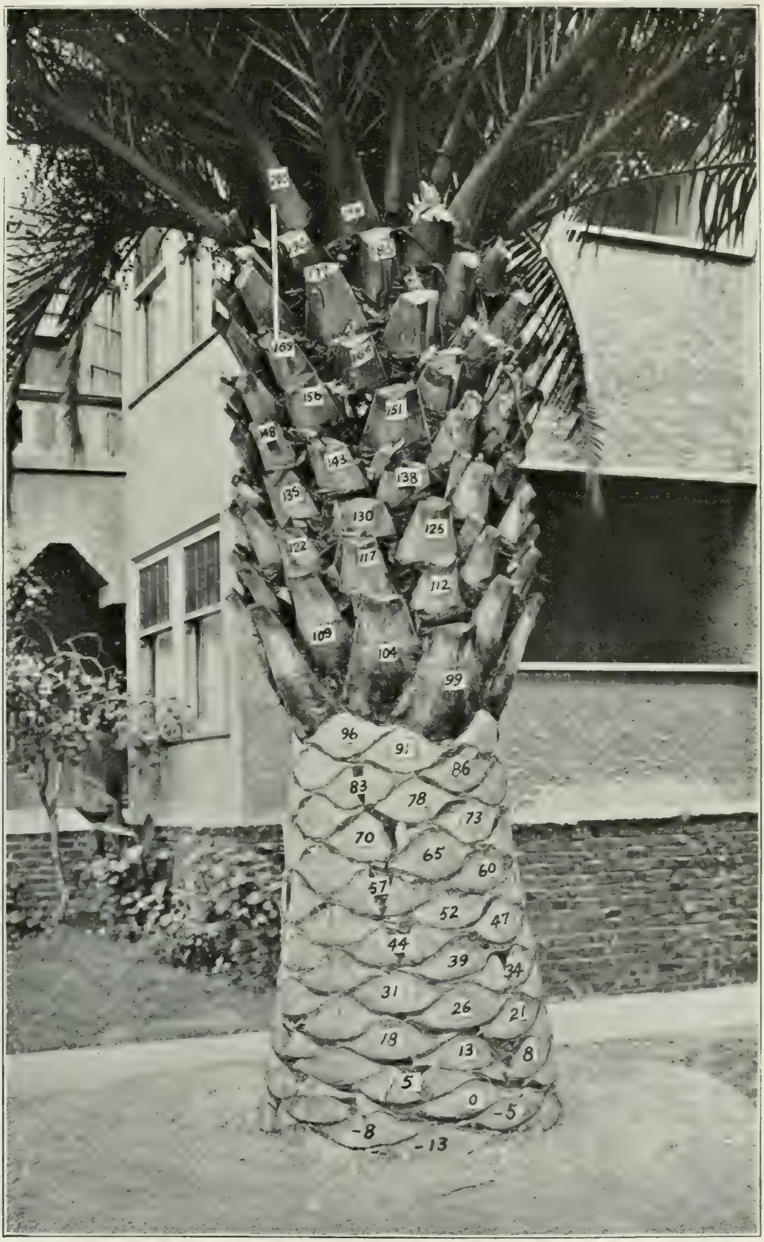
Within the limits of this short paper it has not been possible to attempt more than a demonstration of the fact and the method of orderly phyllotactic transition from one of the established patterns to another. The many and larger questions which grow out of this study must await further study.

Note.—Concerning these the writer will be glad to receive suggestions from any one interested in these matters. His address is 2639 Durant Ave., Berkeley, Cal.

Explanation of the Plates.

Plate I. *Phoenix Canariensis*, with right-hand primary spiral—clean-shaven below and with fruit-clusters appearing above among the leaves. All traces of Zones I and II have perished, save that a few leaf-scars from the upper edge of II are still visible just at the surface of the ground (Nos. –8, –13, –5). These are the upper ends of 13-ranked secondaries curving sharply upward from the transition zone below to become the vertical ranks of Zone III. Rising obliquely right and left are the 8-ranked and the 5-ranked secondaries, the former having the steeper pitch. At the level of leaf 52 the vertical ranks began to incline toward the left, as they enter the transition of Zone IV; causing the grade of the 8's to become a little steeper, and that of the 5's to become less steep, as the rotation progresses. At the level of leaves 164–169 the transition comes to an end, and the 34-ranked regular pattern begins so that leaves 198 and 203 stand vertically above the two last named.

Plate II. *Phoenix Canariensis*, with left-hand primary spiral, reversing all the alignments of Plate I, and showing a much lower section of the record than is commonly preserved—Zones II (in part), III, IV, and the lower edge of V. The great curve of the 13's is strikingly shown in its continuous form, without pause at verticality in Zone III, and convex toward the left, turning at about the level of leaves 101–104 into the transition of Zone V. Within the crown of leaves, above, Nos. 161 and 156 may be seen vertically placed above Nos. 127 and 122. Zones III and IV are here much more condensed than in Plate I.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A METHOD OF TEACHING THE EVOLUTION OF THE LAND PLANTS

By B. W. Wells.

One of the bêtes noires of elementary botany instruction is the problem of getting across the story of land plant evolution with its complications arising out of the alternation-of-generations situation. I suppose it is safe to say that the majority of students who survive freshman botany do not really grasp the facts of the complete reversal in the food relations of the two generations, the progressive differentiation associated with sex and other fundamental generalities which are familiar to the advanced botanical student.

This failure is primarily due to the fact that the types are taken up one at a time with no genuine opportunity afforded to bring all of the significant types together so they may be automatically compared; for only the comparative method constitutes the vital approach to such an evolutionary problem.

The writer a number of years ago overcame in great part the above mentioned weakness in his teaching by introducing the concentric method of handling the life cycles.

Professor J. H. Schaffner, of Ohio State University, first used the diagrammatic method of presenting the life history of plants by arranging the significant stages at intervals in a circle. These intervals are marked out by radii. And those used by the writer are the ones suggested by him in his Laboratory Guide.

The writer's adaptation of Schaffner's method is involved in requiring the student to draw the life cycles of the type plants in a concentric manner, the lowest in the scale of evolution at the center, the next higher around this, and so on. For this purpose they are furnished a large durable sheet of paper, such as an unfolded genus cover. After the student has finished his laboratory and text study of a liverwort (preferably *Ricciocarpus*) he is introduced to the life cycle method by furnishing him the necessary sketches or the finished cycle, which he is at liberty to copy

on the innermost guide circle of his large sheet. (The student should have previously drawn lightly the proper number of radii and circles to take care of the types to be offered.) It is well to similarly assist the student with his second cycle until he "catches" the idea. After that he goes it alone. Acquiring his data from all possible sources he organizes it on his sheet where he cannot escape comparing the stages with those of preceding types, with the delightful result that a goodly proportion of the learners really "get the big idea" which is intended for them.

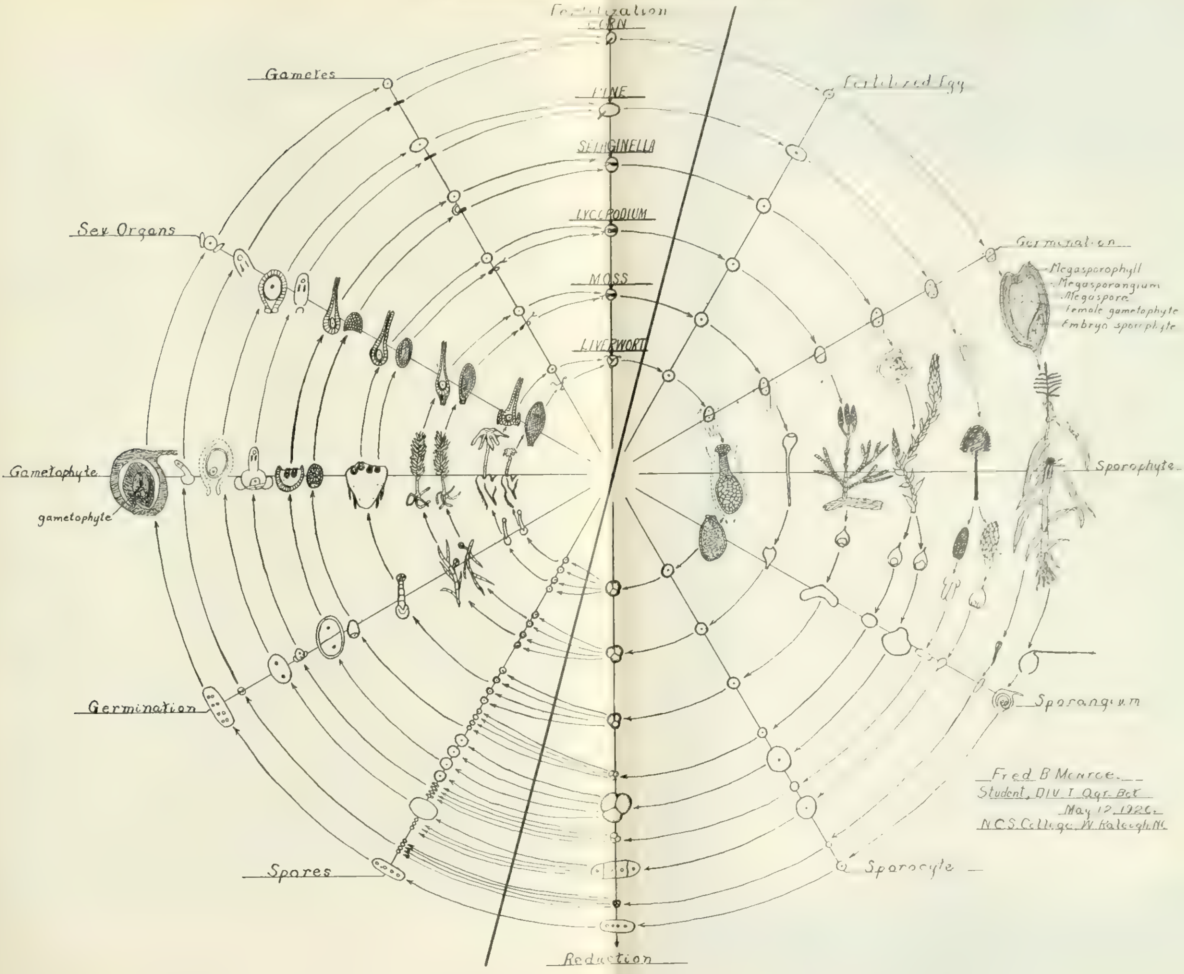
The accompanying plate is the work of an unassisted student, Mr. Fred B. Monroe. Above all it is important that the *students* make this little chart; for the instructor to make a large one (wall chart size) to be used as a basis for mastering the situation would be an unfortunate pedagogical error.

A few comments on some of the desirable features may not be out of place. Homologous structures are on the radii: Opposite radii show contrasting conditions in the two generations, viz., sporophyte *vs.* gametophyte; fertilization *vs.* reduction; sex organs *vs.* sporangia, etc.; on the right of the heavy diagonal line sporophyte structures ($2x$ number of chromosomes) are diagrammed; on the left gametophytic ones (x number of chromosomes). Passing outward along a radius gives a summary of the evolutionary changes in that structure, the sporophyte and gametophyte radii, of course, being of the most significance.

In the higher land plants in which sporophyte and gametophyte tissues remain together it is desirable to indicate this in the drawings on some of the radii by carrying the structures over the dividing line between the generations, differentiating them from each other by drawing one with dotted lines or handling them with different colored inks. Further, as shown in the student's diagram it is desirable to introduce the seed (or grain in the case of corn) in its proper place, diagramming its parts and thus summing up the life cycle structures as they are actually "summed up" in the seed.

The plate as presented is by no means perfect and should not be understood as showing all of the possibilities of the method.

—LIFE CYCLES OF TYPICAL LAND PLANTS—



Improvements and variations may be easily made by the instructor. I preferred to use this production of a freshman student, for it indicates how far a youthful mind can go, provided it is given a logical start.

In conclusion let me assure my readers that by the above method in which the student is given a chance to construct something (and all students enjoy making something grow) that that veritable terror of alternation-of-generations in the land plants has lost his Stygian aspect; in fact the writer personally enjoys nothing more than directing working mentalities as they solve this problem for themselves.

North Carolina State College,
Raleigh, N. C.

A STRANGE FRUIT

By H. H. Rusby.

Jarilla Sesseana (Ramirez) Rusby (*Mocinna heterophylla*, var. *Sesseana* Ramirez, *Anales Inst. Med. Nac.* **1**: 207, t's 3–4 (1894); not *Mocinna* of Lagasca (1816), of Bentham (1839), nor of Cervantes (1885).

On a day in late summer, while traveling through the mountains of the Mexican table-land, near Empalma de Gonzales, one of my peons brought me a fruit of very curious form, calling it *Jarilla* (meaning "little jar") and stating that it was very good. Since he had separated it from its stem, I mistook its base for its summit, and was for a moment quite confused as to its morphology. About as large as a small canteloupe, and of an ovoid form, its elongated and thickened accrescent style looks not unlike a peduncle, this impression being strengthened by the appearance at the other end of five elongated and fleshy, curved appendages which could well be five ascending accrescent superior calyx-lobes, were it not for the fact that in reality they are basal, and recurved about the summit of an elongated peduncle, the stump of which I had mistaken for the style. These appendages are

confluent at their bases to form a rim, enclosing a large concavity, in the center of which the peduncle is attached. The fruit is one-celled, but the cavity is nearly filled (in the half-ripe state in which I saw it) with innumerable seeds a little like small cucumber seeds, originating from 5 placentae and borne on very long funiculi. The seeds have a fleshy outer covering that seems to be

The Jarilla (*Jarilli Sesseana* (Ramirez) Rusby). Copied after Ramirez (*Ann. Inst. Med. Nac.*, 1, Lam. iv.)

a sort of aril, beneath which the surface is rugose. This covering, the fleshy funicles and the placentae, are said to be eaten. I could gain no adequate idea of the flavor or other edible qualities from the ignorant peon, but I found the anomalous form and structure of the fruit sufficiently interesting. The floral characters, and those of the plant itself, are not less so. The herbaceous, prostrate or reclining milky-juiced stems, approximating a yard in length, are produced from a large tuberous rhizome, and are hollow, fleshy and juicy. The leaves are alternate, smooth, glaucous beneath, somewhat triangulate, the margin varying from sinuate to 3-lobed, and palmately 3–5 nerved. Those of the female plant have a large light blotch on the upper surface. The small lilac or violet tubular flowers exhibit remarkable differences in the two sexes, the most striking of which is the alternation of the petals with the calyx-lobes in the pistillate flower, while they are anteposed in the staminate.

Since the plant appears never to have been described in English, an abridged translation of Ramirez' description is here given, in addition to the above notes.

Largest leaves with blade 5 or 6 cm. long, by 3.5 or 4 cm. wide, the petioles as long as the blade, nearly horizontal and cylindrical, with a branch and an inflorescence in each axil. Inflorescence a subdichotomus raceme in the male plant, solitary in the female.

Staminate Flowers.—Calyx very small, 5-fid, the lobes triangular, opposite those of the corolla, lightly rose-colored at the margin. Corolla light-purple, funnel-form, with variable praefloration, the tube lightly narrowed upward and with a few hairs within, below the throat, the lobes oblong. Stamens 10, introrse, inserted in the throat, their summits all at the same level, the filaments united at the base, five of them very short and opposite the corolla-lobes, the alternate ones much longer, the anthers basifixed, those with short filaments longer, longitudinally dehiscent. The large connective forms a margin for the posterior surface and projects above, and is hairy. Rudimentary ovary filiform.

Pistillate Flowers.—Peduncle 4.5 cm. long, bearing two or three bracts. Calyx as in the staminate, but the lobes alternating

with the petals, which are oblong with a small dilatation at the base. Stamens none. Ovary ovoid, one-celled, five-lobed, bearing five fleshy accrescent prolongations at the base, alternate with the stigmas and lobes of the ovary, and opposite and covering the petals at the base. Placentae five, the numerous ovules inserted on long funicles. Style small, accrescent, the stigmas five, papillose, at first horizontal then ascending.

Berry one-celled, ellipsoidal, with the basal appendages and style accrescent, the former enclosing a basal concavity. Seeds numerous, rugose after the separation of the sarcotesta. Embryo straight. Cotyledons plane, the caulicle apparent and cylindrical. Endosperm abundant, peripheral. Funicles spongy, filling the cavity of the ovary. The fruit, when cut, exhales the odor of lemon and citron.

Flowers from June to September. The plant occurs at various places in Jallisco and Guanajuata.

The difference between this and *J. heterophylla* (*Mocinna heterophylla* Cerv. ex. La Llave) appear to me clearly specific.

REVIEWS

Sturtevant's Notes on Edible Plants*

When, six years previous to his death in 1893, Dr. E. Lewis Sturtevant, the distinguished first Director of the New York Agricultural Experiment Station at Geneva, retired to private life, he left at the Station a voluminous series of notes comprising a compilation of then-existing knowledge concerning the edible plants of the world. For twenty years this valuable manuscript, the work of nearly a quarter of a century on the part of Dr. Sturtevant, remained untouched. Now, thanks to the able efforts of Dr. Hedrick, Sturtevant's Notes are made available in what, without question, represents one of the most generally useful reports ever issued by a State Agricultural Experiment Station.

* Hedrick, U. P., Sturtevant's Notes on Edible Plants. Pp. vii + 686, Report New York Agricultural Experiment Station, 1919, Pt. II. Also Twenty-seventh Ann. Rep. New York State Dept. Agr., Albany, Vol. 2, Part 2, 1919.

The difficulty of securing precise and reliable information regarding the origin and history of cultivated plants is appreciated by all who have made the attempt. For the most part, the data of this sort contained in readily accessible works is exceedingly scanty and too frequently it is of doubtful accuracy. Hitherto the works of De Candolle have been regarded as the most authoritative source of information along these lines; but De Candolle gives the origin of barely 250 cultivated plants. The present volume lists nearly 3,000 species of plants which may be used for food, most of them cultivated, and especial stress is laid on their origins and histories. Of particular value in this connection are the copious references to the literature, upwards of 6,000 separate citations being given, and nearly 500 different titles being quoted in the bibliography.

Bringing together, as it does, and making available for convenient reference a vast body of facts relative to edible plants, gathered from many widely scattered and often virtually inaccessible sources, Sturtevant's work would be of great value if only as a compilation or compendium of existing knowledge. But the book is more than a compilation: it embodies many original observations on the part of the author—facts not before brought to light and new points of view regarding facts already known. The original home of many esculents is here definitely recorded for the first time; new landmarks in the history of edible plants are pointed out and much new information is brought forth regarding the history of plants, especially those of the New World; fresh observations are presented regarding variations in plants induced by cultivation; and many data are set down that will throw light on various problems of plant geography and acclimatization.

The subject-matter in the text is arranged alphabetically, by genera and species, the *Index Kewensis* being taken as the standard of nomenclature. Following the scientific name, for each genus, is the natural family to which it belongs; for each species, one or more of the English common names. The descriptive matter, which varies in length from a single printed line to as

many as eight pages, ordinarily takes into account the nature of the plant in question, the various characteristics of the edible portion and how it is prepared for eating, its native home, and its history as a cultivated plant. The work concludes with an index to synonyms and one to the common names.

The Notes as published, while based primarily on the manuscript already mentioned, include in addition much material taken from other writings of Sturtevant, both published and unpublished, and due credit must be given to Dr. Hedrick for the efficient manner in which he has completed his arduous editorial task.

George E. Nichols

PROCEEDINGS OF THE CLUB

Meeting of October 27

The meeting was held at the New York Botanical Garden.

The following were elected to membership: Charles Drechsler, A. J. Riker.

The chief item of the program was a discussion by Mr. Henry Bird on "The Production of Acid Soil by Artificial Means." Mr. Bird became interested in this problem as a means of keeping various acid-loving plants alive to serve as insect-food. He succeeded in keeping Sarracenias and various Ericaceous plants for indefinite periods, obtaining flowers and normal growth. His most satisfactory procedure was to apply "acid" by watering the bed frequently with a solution of tannin obtained from hemlock bark.

The second item was an account, illustrated by specimens of an undescribed species of persimmon, *Diospyros Mosieri* Small, from Florida.

Dr. N. L. Britton instanced the occurrence in California and Oregon of ten species of rather widespread eastern sedges, *Cyperus*, *Eleocharis*, *Rynchospora* and *Scirpus*. He emphasized their remoteness from the nearest colonies of the same species eastward.

Meeting of November 9

The meeting was held at the American Museum of Natural History.

Dr. G. Clyde Fisher gave an account of "A Naturalist's Rambles in Florida." He discussed central and northwestern Florida, and his views of the peculiar vegetation of this portion of the state were particularly appreciated. Many of these were of plants too little known, as the various large species of Sarracenia and other insect-catching plants. The vast forests of long-leaf pine, the cypress ponds and swamps, the live-oaks and pendant gray Spanish moss were well shown.

Meeting of November 24

The meeting was held at the New York Botanical Garden.

The treasurer presented an outline of the present financial status of the club. After considerable discussion this was referred to the Finance Committee for further consideration.

The following were elected members of the club: Dr. Louis J. Hodes, Mrs. A. C. Sheahan-MacKenna, A. J. Sluyter.

The scientific program consisted of two discussions.

Dr. M. A. Howe described "A Fresh-Water Red Alga from Trinidad." He exhibited and discussed specimens of a red alga collected by the New York Botanical Garden expedition to Trinidad in Maracas Waterfall at an elevation of 1,500 feet above sea level. The Trinidad plant was identified with a species first discovered in Venezuela and more fully described at about the same time, under three specific names, from mountain streams of French Guiana. The speaker alluded to another red alga, *Caloglossa Leprieurii*, found in a mountain stream in Porto Rico and also in the Hudson River at West Point.

Dr. John K. Small told of his search for the rare box huckleberry, *Gaylussacia brachycera.* He visited the three known stations for the plant, on the coastal plain of Delaware and in the Blue Ridge Mountains of Pennsylvania. He expressed the opinion that each colony was really a single plant widely spread below ground with hundreds of ascending stems, covering in one case over a hundred acres.

Meeting of December 14

The meeting was held at the American Museum of Natural History.

Mr. George T. Hastings gave an illustrated lecture on Floral and Scenic Features of Chile. The account was based on experiences of several years ago and gave an interesting glimpse of the vegetation of the desert north and of the moist south part of the country and of the mountains of central Chile.

Meeting of January 11

After hearing the report of the Finance Committee the question of a more economical budget was raised. To meet the main expense it was decided to appeal to all members for special funds to meet the cost of the publications. It was announced that $1,000.00 had been promised on condition that an equal amount be raised by May 1, 1921.

The following were elected to membership: Walter S. Allen, Mrs. G. P. Anderson, Miss Sidonia Berkelhamer, Don M. Benedict, Miss A. Oleson, Jack Schuster, and Dr. Neil B. Stevens.

Officers for the coming year were elected.

Meeting of January 25

The meeting was held at the Morphological Laboratory of the New York Botanical Garden.

A report of the Budget Committee was read and accepted. This report included a recommendation that for the first six months of 1921 the pagination of Torreya should not average over 16 per issue and of the Bulletin 25, unless the expense of additional pages should be met by contributors.

The following were elected to membership: Daniel W. Babcock and Harold V. W. Halsey.

Dr. Small described a wild pumpkin found growing plentifully in the dense hammock on the eastern and southern shores of Lake Okeechobee, Florida. He believes this to have been the original home of the cultivated pumpkin.

Dr. Stout described some experimental studies he has been carrying on for ten years. A large number of bud sports have been cultivated and their color patterns compared with seed variations. The conclusions were that seed variations give only slightly greater variation in pattern than the bud sports, that the yellow element is a physiological chlorosis, probably infectious, and occasionally transmitted through seed, and that color patterns as such are not inherited.

Dr. Williams showed and described fragments of mosses found in the stomach of reindeer killed in Alaska.

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TORREYA

Vol. 21 No. 4

July–August, 1921

STERILITY AND FERTILITY IN SPECIES OF HEMEROCALLIS

For a number of years problems of fertility and sterility in numerous species of plants that freely and naturally propagate by vegetative means have been under investigation by the writer. In these studies several species of *Hemerocallis* have received considerable attention, and a brief preliminary report of the results obtained with them has been given (Journal N. Y. Bot. Garden **20**: 104–105, May, 1919). Certain aspects of the research await the blooming of seedlings that are now being grown and the testing of wild plants of several species which it is hoped can be obtained from their native home in the orient. But the results already obtained, and in part published, supplement and to some degree extend the observations recorded in a recent number of the Torreya (**21**: 12–13, Jan. and Feb. 1921) and for this reason may be briefly summarized for the readers of this journal.

It is to be noted that the double-flowered form of *Hemerocallis fulva* reported in Torreya (**18**: 242) and referred to later (Torreya **21**: 13) is undoubtedly an old and well known sort. A double-flowered variety of this species is reported by Thunberg in his Flora Japonica published in 1784 and there identified as the double-flowered plant which Kaempfer (Amoen. Exot. 1712) thought was an *Iris*. At the present time two double-flowered varieties are recognized (Bailey, Cyclopaedia of Horticulture) as belonging to *H. fulva*. One of these, var. *Kwanso*, is illustrated in color in Gartenflora in 1866 (plate 500) and there said to have been introduced into Europe by von Siebold. This is evidently the double-flowered form most widely found in cultivation in Europe and America. The other variety (*flora plena*) is illustrated in color in Flora des Serres

(1869–1870) and there called *H. disticha* var. *flora plena* (*disticha* is now considered as a synonym of *fulva*). The colored plate shows this to be quite different from var. *Kwanso* in appearance. The writer has never seen this variety. A double-flowered variety has also long been known in the species *H. Dumortierii*.

A thorough search of the literature indicates that no one has ever reported fruit on the single-flowered type of *H. fulva*. This orange-colored day lily is widely distributed over Europe and America. Its complete failure to produce fruit and seeds has often been noted. Only one variety of it (var. *maculata*) appears to have been involved (probably as a pollen parent) in the production of hybrids.

In the writer's experiments with this species many intra-specific pollinations have been made between plants obtained from such widely different sources as Wisconsin, Michigan, New York, Vermont and England with complete failure in every case. The ovaries of flowers thus pollinated do not start to enlarge, and about 72 hours after the flowers open the entire flower falls leaving only spurs as shown at *a* in Fig. 4.

But the pollen of this species used in controlled crossing on *H. flava* has given pods (Fig. 2) with seeds and the hybrids resulting are now being grown. The reciprocal cross between these two species failed to yield mature pods. Pollen of *H. fulva* on *H. minor* has given seed but no germination was secured.

Pollen of *H. Thunbergii* and of *H. aurantiaca* has been used on many flowers of *H. fulva*. Usually the pods begin to form and seeds start to develop with some of them, but as a rule the pods fall when about one third mature (*b* in Fig. 4). In a few instances, however, mature pods with ripe seeds (Fig. 5) have been secured, but no germination has yet been obtained in such seeds. The reciprocals of these crosses likewise produce seed rarely. From the results of crossing *H. fulva* with *H. flava*, *H. aurantiaca* and *H. Thunbergii* it appears that its pollen and ovules are potent and are able to function in certain relations, but that the compatibility in these combinations is of a weak grade.

The literature gives conflicting reports regarding seed production in *H. flava.* Some investigators have reported plants of it to be self-fertile, others have reported the plants they have studied to be self-sterile. Both self-compatible and self-incompatible plants have been found among plants of this species grown in the New York Botanical Garden. Such conditions are often seen in a species in which self-incompatibility is present, especially if the species is propagated by seed (*Cichorium Intybus, Nicotiana Forgetiana, Eschscholtzia californica, Brassica pekinensis, Brassica chinensis,* and others). The most highly self-compatible plants produce pods in abundance, but in them are many shrivelled ovules in which fertilization may not have occurred and seeds in various stages of embryo abortion together with seeds that are fully matured and viable (Fig. 3). This condition is also specially characteristic of plants that are not fully self-compatible.

A third species, *H. Thunbergii,* has in the author's experience proved to be only feebly self-compatible. Very many carefully made self-pollinations fail (see 6, 7 and 8), but many pods do mature and these contain some seeds which will germinate. All the plants of this species which are growing in the New York Botanical Garden have behaved quite the same, but these may have all descended from a single parent through vegetative propagation. A wide range of self-compatibility may be exhibited by the seedlings which are to be tested as soon as they bloom.

The type of sterility in these species is, undoubtedly, that of physiological incompatibility operating between the organs concerned in sexual reproduction. The readiness with which these species propagate from pieces of the roots and by rhizomes has practically eliminated the use of seeds in commercial propagation. Such a method tends to perpetuate the grade of self-compatibility of the original plant which was used. It is possible that the plants of the single-flowered type of *fulva* now growing in America and Europe may have all come by vegetative propagation from a single plant which happened to be fully self-in-

compatible. According to Clusius (*Plantarum Historia,* p. 137) this species was commonly in cultivation in middle Europe as early as 1601. Since then its cultivation has been extended over large areas of Europe and America, and in many sections it has escaped from cultivation and is spreading widely, purely by vegetative means of propagation.

It can be predicted with confidence that a search in the region where *H. fulva* is native and wild will reveal plants that are producing seed or at least strains that will prove compatible with the self-incompatible strain now found in the United States. Focke showed that such a condition as this existed in *Lilium bulbiferum.* After failing for years to get seed by selfing and crossing plants of this species obtained from various parts of Germany, he obtained wild plants from the native habitat in Tyrol and these he found compatible with strains that previously failed to produce seed.

It has very generally been held that the seed sterility of such plants as *Hemerocallis fulva, Lilium bulbiferum, Lilium tigrinum,* etc., is "correlative." That is, the vegetative organs of propagation are conceived to divert and utilize the available food so that the embryos in seeds are virtually starved to death during stages in development, or perhaps organs are so poorly nourished that they do not function previous to fertilization. But evidence is increasing to the effect that seed production in these plants is relative and depends on whether fertilizations are compatible, quite as is the case in numerous species of plants that are naturally propagated only by seeds. The experimental proof of this is sometimes difficult to obtain in the plants that are propagated vegetatively.

When self-compatible and self-incompatible plants are found and the latter prove to be highly seed-producing in certain crosses, as is the case with *Hemerocallis flava,* the evidence of incompatibilities is clear. The American strain of *Hemerocallis fulva* has sex organs that do function to some extent in certain inter-specific crosses and will, undoubtedly, produce abundant seed when it can be tested with stocks from a dif-

EXPLANATION OF PLATE

1. Pod of a plant of *H. flava;* the result of self-pollination showing that the plant is self-compatible.

2. Pod on same plant as 1; the result of controlled cross-pollination with pollen of *H. fulva.*

3. Seeds from such a pod as shown in 1 and 2; some ovules become mere rudiments of seeds and evidently are not fertilized; some embryos die during the development of seeds; some seeds develop fully and are viable.

4. Flowering branch of *H. fulva* near close of period of bloom. (*a*) Spur left when flowers fall. (*b*) Pod 10 days old, from cross with pollen of *H. Thunbergii,* but becoming wrinkled and about to fall. Occasionally such pods contain one or two partly developed seeds.

5. Mature pod of *H. fulva* from cross-pollination with *H. Thunbergii.* Such pods are rare. As far as known to the writer this is the first time the fruit of this species has been illustrated.

6, 7 and 8. All from a single plant of *H. Thunbergii.* All flowers carefully self-pollinated. Some pods (*a*) maturing and yielding a few viable seeds; some pods (*b*) becoming much shrivelled; no good pods on branch shown at 8. Results characteristic of feebly self-compatible plants of this species.

ferent seed source. But to obtain these, plants from widely different geographical sections or even wild plants from the native habitat may need to be secured.

A. B. Stout.

New York Botanical Garden.

AN ORTHOTROPOUS OVULE IN *HYACINTHUS ORIENTALIS* L.

While sectioning ovaries of the hyacinth for embryo sacs one ovary was found which shows two irregularities. One of the ovules in the upper part of the ovary is orthotropous instead of anatropous. This ovule, as figure 1 shows, is typical in all other respects, the integuments, micropyle, nucellus, and embryo

Fig. 1

sac being well formed and apparently functional. In the median portion of the ovary the carpels seem to be incompletely fused and the placentas are slightly displaced (Fig. 2). Mas-

FIG. 2

ters[1] and Worsdell[2] describe many types of modified carpels and displaced placentas in a great variety of flowering plants. These authors describe also many modifications of ovules, but I do not find that either of them records a case of an orthotropous ovule in a plant which normally bears anatropous ovules.

A. M. SHOWALTER

A STATION FOR THE RAM'S-HEAD LADY'S-SLIPPER

On May 19, 1921, Philip D. Fagans, Executive Secretary of the Woodcraft League of America, discovered near Westport-on-Lake Champlain, New York, a colony of the Ram's-head Lady's-slipper (*Cypripedium arietinum* R. Brown) in bloom and collected a specimen which he showed the next day to Oliver P. Medsger, Head of the Department of Biology in the Lincoln High School, Jersey City, N. J., and myself. Since neither of us had seen this rare orchid growing, Medsger and I lost no time in visiting the place. Although we did not make a careful census, there were doubtless fifty or more plants in the colony. They were growing rather scattered in the meso-

[1] Vegetable Teratology. London. Ray Society, 1869.

[2] Principles of Plant Teratology. Vol. II. London. Ray Society. 1916.

phytic woods, mostly on a gently sloping hillside, only a few rods from the lake beach. Medsger made a photograph of a clump. Since Dr. House states that this plant has been collected but a few times in the northern counties of the State of New York, I thought this worth reporting.

G. Clyde Fisher

American Museum of Natural History

S. M. TRACY AS A BOTANIST

The recent death of S. M. Tracy has been felt as a keen personal loss by all who have known him not only as a broad-minded, many-sided investigator but as a most genial companion and friend. His main life work was with forage plants adapted to the Southern States and with the effort for securing a greater diversification of southern agriculture.

I had been experimenting with fungicides in the treatment of pear scab when I first met Tracy. I was delighted to find that he was interested in fungi and showed him my cultures. We at once became great friends and continued to correspond regarding fungi until the time of the New Orleans Cotton Exposition which took us both South where we both remained. I lived for ten years on the Gulf coast of Mississippi while he was director of the State Experimental Station at Starkville. He bought a summer home on the north coast of Biloxi Bay not far from us where he spent his vacations collecting and studying the Gulf coast flora. It was during this period that I was most closely associated with him tho later we were companions on several extended collecting trips, notably the one to the La Plata Mountains in southwest Colorado in company with C. F. Baker and at another time a long trip through the Davis Mountain country in western Texas.

As a horticulturist and practical green house man Tracy was naturally greatly interested in plant breeding. He did much practical work in the selection and improvement of varieties. At one time he was greatly interested in the long staple upland cottons and did much to improve and stabilize

these kinds. As a botanist however his interests were frankly taxonomic. He liked plants as such and liked to study their relationships. Living as he for the most part did away from the great botanical centers with their libraries and herbaria his activities naturally took the form of field work and of collecting rather than the writing of extended monographs. He loved the open, and the collection and preparation of specimens. He was always collecting in large sets which he distributed widely and in this way probably did more than any other man of his generation to make the plants of the Southern States available for study in all of the more important American and European herbaria. His interest in forage plants led him to specialize in the grasses. He was also a student of the parasitic fungi, particularly of the rusts and the smuts, the two groups most likely to be found on grasses. His botanical papers largely deal with these two groups in both of which he discovered and described a number of new species. As with the flowering plants however his collections and field studies of the fungi were much more extensive than his publications regarding them. Excepting for his early years in Missouri botany was Tracy's recreation rather than his chief work. During the long period of his activity however there were few who contributed more than he to the real knowledge of American plants.

F. S. Earle.

REVIEWS

Martin's Botany with Agricultural Applications*

The suggestion of the technical implied by the original title of this volume (Botany for Agricultural Students) has led the publishers to issue the second edition under a new name, one that conveys somewhat more accurately the real nature of the book. While primarily designed as a text for agricultural students, the underlying principle of the book is one that is rapidly coming to the fore at the present day, viz., that, regard-

* Martin, J. N., Botany with Agricultural Applications, xii + 604 pages, 490 figures, John Wiley & Sons, New York, 1920, $3.00.

less of the class of students concerned, the chief object of botanical instruction in an elemntary course should be to teach the fundamental facts and principles of botany and to relate these to problems of practical interest.

A list of the chapter headings will suggest the nature of the topics treated: (*Introduction*) the nature and subdivisions of botany; a general view of plants; (*Part I*) flowers; pistils and stamens; seeds and fruits; germination of seeds, seedlings; cells and tissues; roots; stems; buds (including growth of stems, pruning, propagation by stems); leaves; (*Part II*) thallophytes (separate chapters on algae, myxomycetes and bacteria, fungi); bryophytes; pteridophytes; spermatophytes (two chapters); classification of angiosperms, and families of economic importance; ecological classification of plants; variation; heredity; evolution.

The present edition differs from the first in that several portions of the text have been rewritten, the chapter on variation added, and many of the illustrations replaced by new or improved ones.

George E. Nichols

Trees of Indiana

The second edition, completely rewritten, of Chas. C. Deam's Trees of Indiana * is an extraordinarily satisfactory publication. It is gratifying to consider that thousands of students, farmers, amateur botanists, and tree-lovers in general throughout that state may profit by such carefully written work from the pen of Indiana's most thorough student of the local flora.

Deam has recognized 132 species and 20 varieties of forms. Each of the former and one of the latter is illustrated by a full-page half-tone plate, photographed from a herbarium sheet. Since the sheets were chosen from Deam's own carefully prepared herbarium, the results are excellent and in most cases far better than one would naturally expect. Either fruits or flowers, or both, and frequently bark, are represented. The

* The Department of Conservation, State of Indiana, Indianapolis. 1921, 317 pages, 137 plates.

method leaves something to be desired in certain cases, where the flowers or fruit illustrate important specific differences, but it must be remembered that the book is prepared for the amateur and not the professional botanist.

The nomenclature "attempted" is that of the International Code. Synonymy is omitted. Descriptions are carefully drawn from Indiana material. The general distribution of each species is indicated and ranges within the state are discussed in such detail that the book will be an important source of information for phytogeographers. A third paragraph includes general notes, largely of a popular nature, on the abundance, uses, and local names of the plant and other miscellaneous information.

The genus *Salix* is contributed by C. R. Ball and the family *Malaceae* by W. W. Eggleston.

The whole treatment is conservative and impresses one as having been carried out with extreme care and consequently reliable results. The attitude of the author toward "splitting" is clearly shown and may be indicated here by two quotations:

"Nieuwland separates a variety from the smooth forms which he calls *Sassafras albida* variety *glauca* and reports it as occurring in the counties in the vicinity of Lake Michigan. The writer has at hand 46 specimens from 41 counties in Indiana, including all of the Lake Michigan Counties, and he has not been able to find a single character that is constant enough to make a division of our forms."

"While Sargent's key to *Tilia* quite distinctly separates the species and varieties, yet when specimens are collected from an area where the species overlap and seem to intergrade, the task of referring a specimen to the proper species or variety is not an easy one."

The same care has been used in excluding 23 reported species, each of which has been the subject of detailed investigation.

The book closes with a list of measurements of large specimens of Indiana trees, a table of specific gravities of woods, two state maps, and an index.

Typographical errors are very few, print and paper are good, half-tones are well executed, and the cloth binding is substantial. Both the author and the Department of Conservation are to be congratulated on the work.

H. A. Gleason

PROCEEDINGS OF THE CLUB

Meeting of February 25

Announcement was made of the death on January 30 of Dr. George T. Stevens, of this city. Dr. Stevens had done much to make general an interest in botany, especially through his illustrated "Guide to the Wild Flowers of the Northeastern United States." Dr. W. A. Murrill, under the title of Notes on Fungi, remarked on the recent finding of underground fungi, chiefly truffles in the United States, and on their method of collecting them. He also called attention to a curious double specimen of the cultivated mushroom, an illustrated account of which has since appeared in Mycologia **13**: 119–122.

Mr. R. S. Williams gave an account of mosses recently received from the district of Kaietur Falls, in British Guiana. Of eleven species, one, a *Macromitrium*, proved to be undescribed.

Dr. J. K. Small discussed the species of palmetto, *Sabal*, in the south giving the history of the discovery of each, and showing specimens of his own collecting.

Meeting of March 6

Dr. H. A. Gleason gave an illustrated lecture on the Big Trees of California. He showed an extensive series of views and described the vast size and something of the past history of *Sequoia gigantea*. He strongly urged the need of bringing more of these giants into park reserves.

Meeting of March 26

On Saturday afternoon the Torrey Club in cooperation with the New York Bird and Tree Club and other local organizations attended a lecture at the American Museum of Natural History by Dr. Edgar T. Wherry on Where the Wild Flowers Grow and Why. The speaker chiefly considered the nature of the soil, this forming the most variable feature of the plant's environment locally and laid stress on its chemical character.

Meeting of March 30

The scientific program consisted of three papers. Miss Cornelia L. Carey explained the structure of an agar gel. "The structure is not to be confused with an ultramicroscopic one, but is much coarser and appeared when the dried gel that had been soaked in water was viewed under the microscope. It consisted of horizontal concavities each shaped like a convex lens in section, and together giving almost the aspect of lamellations. The structure varied somewhat in gels of different strengths, gels of lower concentration showing chiefly larger slits and those of higher agar content more fine ones. When removed from the water the gels would exude under pressure a considerable amount of liquid. The slits were also visible to the eye when light was reflected from the cut surface.

"The structure is considered as due to rapidity of drying, as all gels dried at 43° C. and 70° C. showed this whether they were dried upon frames or not, whereas this was not true of gels dried at room temperatures. The formation of this structure started when the gel possessed 92–92.5 per cent. and ceased with 21.5 per cent. by weight of water. Gels varying in agar content from 0.5–10 per cent. were used."

Dr. T. E. Hazen reported on his studies in motile algae, considering the phylogeny of Brachiomonas and Lobomonas. This brought out the problem of the development of lobed structures among unicellular algae. Some of the results of this study will be presented in an early number of the Torrey Bulletin.

Miss Edna L. Smith discussed the formation of mucilage in some floral organs of certain orchids. She had studied especially the genus *Brassia* and considered that there the mucilage was a product of the cytoplasm, not as has been thought for some Cactaceae, of the cellulose of the cell wall.

Meeting of April 12

The program of the evening was an illustrated lecture by Dr. Tracy E. Hazen, entitled "Botanizing in Trinidad." Dr. Hazen was one of the party headed by Dr. Britton which visited Trinidad in the spring of 1920, his attention being given to the collection of algae and ferns. While he told of this work, he discussed chiefly the larger features of the vegetation, showing views of forests, savanna, and cultivated fields and many pictures of different species of trees and herbs. Palms, orchids, *Ficus* (with air roots), rubbber tree (*Hevea*), Bromelaids, Melastomads, Malpighiads and Cactaceae were among these.

THE TORREY BOTANICAL CLUB

Contributions to the Special Fund for Support of Publications

In response to letters telling of the financial needs of the Club, the total amount of contributions to date received from membership is $2,211.63. As more than $1,000.00 was received by May 1, 1921, we were able to secure the conditional $1,000.00 to be given if a second thousand could be raised from the membership at large, by that time. The total number of contributors is 94. The list of contributors is as follows:

Dr. N. L. Britton	$1000.00	Mrs. E. G. Britton	25.00
Dr. J. H. Barnhart	100.00	Mrs. R. M. Hoe	25.00
Miss C. C. Haynes	100.00	Mr. E. A. Rau	25.00
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Dr. D. S. Johnson	2.00
Mr. W. W. Eggleston	2.00
Mr. C. A. Weatherby	1.00
Mr. O. A. Farwell	1.00
Mr. F. Dawson	1.00
Mrs. A. M. Smith	1.00
Total	$2,211.63

Of the total pledges of $2,211.63 all but $75 has already been received. While this assistance is both timely and most deeply appreciated the committee charged with the raising of the fund for the support of publications would remind our members and the friends of the club that as prices remain high their continued financial interest is needed.

FRANCIS W. PENNELL,
Secretary-Treasurer.

TORREYA

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THE FOREST FLORA OF GRASSY SPRAIN RIDGE

By G. T. Hastings

In walking through the woods in parts of Westchester County just above New York City the impression was gained that a new type of forest flora is developing there. To test the accuracy of this, and at the same time to see if any correlation could be made between the herbaceous vegetation and particular species of trees, a study was made of the plants on the top and upper slopes of Grassy Sprain Ridge. In the study the adaptation of the quadrat method suggested by Dr. H. A. Gleason* was followed. One meter quadrats were taken every twenty-five paces on lines along the top and slopes of the ridge. On the quadrat each species of herb and shrubs was listed and notes made of the surroundings. All the trees within two meters of the line were counted.

Grassy Sprain Ridge is one of several ridges parallel to the Hudson Valley in Westchester County. These ridges were all originally forested, have all been partially cut over and have generally gone back to forest condition. The ridge is about two and a half miles long, about a half mile broad and is cut across by a swampy area. There are several rocky knobs along both parts of the ridge and a little level land on parts of the summit. The soil is rocky, with frequent outcrops of gneissic rocks, and is nowhere deep or rich except in a few swampy hollows. A small part of the land was formerly cleared, but at present only a very small area is pastured, and none is or has recently been cultivated.

Forty-one species of trees were listed, this including several small forms—*Cornus florida, Carpinus, Ostrya, Hamamelis, Rhus, Sassafras,* and *Viburnum prunifolium*, two cultivated trees that have grown wild, and one that is practically extinct, *Castanea*, and

* Bulletin of the Torrey Botanical Club, 47: 21–33. Feb. 1920.

several others that will disappear as the forest develops—*Ailanthus*, *Robinia*, *Populus grandidentata*, *Betula populifolia* and *Juniperus*. Excluding these, the forest trees that can be expected to persist and make up the final forest number but twenty-six. Apple trees are frequent and in one place in an old meadow have grown up into a veritable orchard of scrubby trees. Cherry trees, *Prunus Cerasus*, are scattered through the woods, usually in rather open places, but a few are in close growths of oak and birch and have assumed a typical forest form, tall and straight with clear trunks for at least twenty-five feet. There are also many young cherries growing up in thickets of *Viburnum* and among the oaks. Over all the ridge there have been frequent fires that check the growth of young trees, but in spite of this there were tree shoots—oak, hickory, ash, maple and elm—on over half of the quadrats, all old enough to have survived at least one fire, and on half as many more there were seedlings of one or two years that had not been subjected to fire.

In all 1,857 trees were counted, 37 per cent. of the total being oaks. Of these *Quercus velutina* was most abundant and made 13.4 per cent. of the total, *Cornus florida*—11, *Quercus prinus*—9.7, *Q. alba*—9.5, *Acer saccharum*—6.4, *Betula lenta*—6.2, *Hicoria glabra*—6.2, *Robinia Pseudo-acacia*—5.7, and *Fraxinus Americana*—4. If the trees that are not of forest type are excluded, the oaks would form over 50 per cent. of the total. The dominant tree in most parts of the ridge is the black oak, *Quercus velutina*, though some of the drier sections were dominated by the chestnut oak, *Q. prinus*. In a few low spots with deeper soil the sugar maple, *Acer saccharum*, dominated, and in the same localities were found most of the tulip trees, basswood, beech and hemlock. Practically all of the locusts were in spots previously cut clean for pasture or cultivation. With the locusts grew all of the pin oak, swamp-white oak, walnut, staghorn sumach and apple, and half of the sassafras, elm, gray birch and sour cherry. But one tree each of *Ailanthus*, *Celtis*, *Populus grandidentata*, *P. tremuloides* and *Quercus stellata* was found, and but two each of walnut and hemlock. Those of which but one specimen was found were

probably accidental entrants, the hemlock and walnut relicts of former more abundant growth. The chestnuts were all dead trunks with young root shoots. Other chestnuts had been cut in recent years, as witnessed by the stumps, so that the 62 dead trees (making 3.6 per cent. of the total) is only about half the number that would have been found before the chestnut canker wrought havoc among them. The young shoots are the heroic effort of the dying trees to hold their place in the forest, but are, of course, of no importance to the future of the forest. Evidently the climax forest will differ from the one it succeeds chiefly in the loss of the chestnuts, walnut and hemlock and in the addition of sour cherry, hackberry and ailanthus. The apple trees, while holding their own with the younger growth, show no sign of being able to persist in a denser and larger forest growth. The locust, sumach, aspens and gray birch are pioneer trees that will later give way. Judging of the future composition of the forest by the young growth, ash will become relatively more important than at present, as there were more of both seedlings and shoots than of any other tree. Hickory, white and black oak, black birch and sugar maple all have frequent shoots and less frequent seedlings, and even with the frequent ground fires will be at least as important in the future as at present. If fires could be prevented dense forest would soon develop. Tulip trees seem to be more sensitive to fire than others, for while seedlings of one season were common older ones or root shoots were entirely absent.

No definite correlation could be made between the shrubby and herbaceous vegetation and the trees. Chestnut oaks, which dominated certain parts of the ridge, had associated with them laurel, azalea and Vacciniums, none of which grew with the black oaks. Under the same trees, too, *Helianthus divaricatus* and *Anychia canadensis* had their greatest frequency indices. Black oak, the most abundant tree, and for large areas the dominant one, had no plants especially associated with it, though the most abundant plant of the region, *Falcata comosa*, had its highest frequency index under these trees, as did also *Poa compressa* and *Potentilla canadensis*. With sugar maple in the damper soil grew all the

Asarum, Bromus ciliatus and *Impatiens*, and the largest proportion of *Anemonella, Antennaria, Arisaema, Aster divaricatus, Polystichum* and *Adiantum*. With the locust trees grew plants characteristic of the open rather than of the woods; in fact, no forest plants at all were found except one plant of *Aquilegia* and one of *Botrychium virginianum*.

It is evident that the climax forest that will develop if allowed to will differ but slightly from the original forest of the region. This difference will be due to the loss of a few species, especially chestnut and hemlock, and the possible addition of a few new species, such as sour cherry and ailanthus, which will never make a large proportion of the trees. There will also be a greater proportion of black oak and white ash. The vegetation below the trees will show more change, as some introduced plants characteristic of open places are so well established in parts of the forest with shallow soil and somewhat xerophytic conditions that they may be considered a permanent part of the forest. Among such plants are *Potentilla canadensis, Poa compressa, Oxalis stricta, Fragaria virginiana, Ambrosia artemisaefolia* and *Rubus occidentalis*.

SOME INTRODUCED PLANTS OF UTAH

By A. O. Garrett

The following paper is supplementary to one entitled "Some Introduced Plants of Salt Lake County," published in the October, 1919, number of Torreya. In that paper sixty-eight species were enumerated as occurring in Salt Lake County. These, together with those here listed, brings the State catalog up to a total of 102 species.

69. *Asparagus officinalis* L. Garden Asparagus. A common escape along streams and irrigation ditches throughout the State.

70. *Rumex Patientia* L. Patience Dock. In Salt Lake and adjacent counties.

71. *Polygonum Convolvulus* L. Black Bindweed. Throughout the State.

72. *Chenopodium Botrys* L. Along the streams of canyons, Salt Lake County.

73. *Chenopodium Bonus-Henricus* L. In Ogden Canyon, Weber Co.

74. *Chenopodium murale* L. In Salt Lake County.

75. *Atriplex rosea* L. Tumbling Atriplex. One of the commonest weeds of waste places in the State, especially where the soil is more or less alkaline. Dr. Nelson described the western weed as a distinct species under the name of *Atriplex spatiosa.*

76. *Amaranthus graecizans* L. Tumbling Amaranth. Common in waste places throughout the State.

77. *Chelidonium majus* L. Sparingly escaping in Salt Lake City.

78. *Thlaspi arvense* L. Field Penny Cress or Mithridate Mustard. Reported from Logan, Cache Co.

79. *Camelina microcarpa* Andrz. Small-fruited False Flax. Throughout the State.

80. *Isatis tinctoria* L. Dyer's Woad. Well established and common in various parts of Box-elder County.

81. *Malcomia africana* (Willd.) R. Br. A common weed around Manti, Nephi, Axtell, etc. In the vicinity of the reservoir south of Juab there are many acres already covered almost solidly with it. Naturally a weed of alkaline soils, it is likely to become one of the troublesome weeds of the State within a very short time.

82. *Galega officinalis* L. Goat's Rue. Collected at Logan, Utah, August 19, 1920, and sent to Dr. Rydberg, who determined it. The specimen is now at the New York Botanical Garden. The specimen collected was certainly an escape. How well it is established, however, I do not know.

83. *Medicago lupulina* L. Nonesuch. Well established in lawns and other grassy places throughout the State.

84. *Medicago officinalis* L. Alfalfa: Lucerne. Escaping from cultivation throughout the State.

85. *Onobrychis Onobrychis* (L.) Rydb. (*O. sativa* Lam.). Sandfoin. Escaping and well established in Rock Creek Canyon, near Provo, Utah Co.

86. *Tribulus terrestris* L. Bur-nut. Well established in Salt Lake City along railroad tracks, where it has probably come from California. The weed is giving a great deal of trouble to automobile tires in California, where the expressive name of "Puncture Vine" is given to it.

87. *Hibiscus Trionum* L. Bladder Ketmia. This plant was observed by me to be well established in cultivated fields at North Ogden, Weber County, and at Provo, Utah County, during the summer of 1919. Last summer I noticed it in cultivated fields at Ogden. None of the Floras give this plant for Utah.

88. *Daucus Carota* L. Carrot; Queen Anne's Lace. Along irrigation ditches in Salt Lake County. Well established.

89. *Cuscuta planiflora* Tenore. Alfalfa Dodder. Common and destructive in alfalfa fields throughout the State.

90. *Anchusa officinalis* L. (*A. arvalis* L.). Alkanet. Escaping and well established in Rock Creek Canyon, near Provo, Utah County.

91. *Cynoglossum officinale* L. Common Hound's Tongue. This weed, detested especially by sheep men, is thoroughly established in Logan Canyon and along the railroad tracks in several places north and south of Logan, especially at Mendon. It is also equally well established at Nephi, Juab County.

92. *Solanum villosum* Mill. Vigorous plants of this weed were observed in cultivated gardens near Lewiston, Cache Co., August 20, 1920. A specimen was sent to Dr. Rydberg for determination.

93. *Hyoscyamus niger* L. This plant has been reported from Kaysville, Davis Co., as well established.

94. *Verbascum virgatum* With. Moth Mullein. Growing abundantly near Ensign Peak, above Salt Lake City.

95. *Veronica Tournefortii* C. C. Gmel. (*V. Buxbaumii* Tenore.) Thoroughly established in Salt Lake and Wasatch Counties.

96. *Veronica hederaefolia* L. Ivy-leaved Speedwell. Reported from Logan, Cache Co.

97. *Dipsacus sylvestris* Huds. Teasel. Thoroughly established on the sides of the ponds along the railroad tracks, etc., from Bountiful, Davis Co., north to Logan, Cache Co., and beyond.

98. *Maruta Cotula* (L.) DC. (*Anthemis Cotula* L.) Dog Fennel; Mayweed. Well established and increasing in Utah, Salt Lake and Beaver Counties, and probably in other parts of the State where it has been introduced.

99. *Sonchus arvensis* L. Field Sow Thistle. An abundant weed along the streets in the southern part of Salt Lake City.

100. *Tragopogon dubius* Scop. Yellow-flowered Salsify. Becoming fairly common at Salt Lake City, but abundant in Cache Co.

101. *Inula Helenium* L. Elecampane. Sparingly escaping, but well established, at Provo, Utah Co., and Orangeville, Carbon Co.

102. *Onopordon Acanthium* L. Cotton Thistle; Scotch Thistle. Permanently established near Grantsville, Tooele Co., and at Salt Lake City.

East High School,
Salt Lake City, Utah.

SHORTER NOTES

The J. Roberts Lowrie Herbarium.*—During August, 1920, the officials of The Pennsylvania State College received a letter from Mr. Roberts Lowrie, of Philadelphia, stating that it was the desire of the family to present the herbarium, prepared by his father, Mr. J. Roberts Lowrie, formerly of Warriorsmark, Pa., to the College. Acting on the suggestion contained in the letter, the writer, accompanied by Professor C. R. Orton, made a visit to the Lowrie residence in Warriorsmark to accept the herbarium on behalf of the College and to learn more of the botanical activities of its maker. On this and a subsequent visit to Warriorsmark, a village at the base of the Bald Eagle Ridge about twenty-five miles southwest of State College, we were most cordially received at the beautiful old homestead by Miss Sarah R. Lowrie.

* A note presented to the Botany Seminar, The Pennsylvania State College, March 16, 1921.

daughter of Mr. J. Roberts Lowrie. From Miss Lowrie and from an account in the Botanical Gazette,* written by Dr. Thos. C. Porter, shortly after the death of Mr. Lowrie, we gained the following interesting information regarding the life of Mr. Lowrie.

In 1854 Mr. Lowrie took up his residence at Warriorsmark, having taken the position as legal adviser and general manager for what was at the time the largest iron manufacturing firm in the United States. This firm "owned one of the largest estates in central Pennsylvania, including farms, furnaces, ore-banks, and many thousand acres of mountain lands covered with forests." Mr. Lowrie was strongly inclined to the study of the natural sciences, particularly botany, and, as Dr. Porter points out, this situation gave him a fine opportunity for such studies. That Mr. Lowrie took advantage of this opportunity to study the native flora is evidenced by the fine herbarium he left which is rich in the rare and interesting plants of central Pennsylvania. The fact that specimens were taken in some of the regions which are now favorite collecting grounds for the botanists of the College adds further interest to this collection. During the sixty-six years since the founding of the Pennsylvania State College, Bear Meadows, an elevated mountain-bog, has been a famous place for botanical explorations. Mr. Lowrie collected there before the college was founded. *Listera convallarioides* Hook., said by Porter to be known in no other station south of northern New York, was collected in Bear Meadows by Mr. Lowrie in 1853. *Prunus Alleghaniensis*, described by Porter, a restricted species of central Pennsylvania, was brought to light by the efforts of Mr. Lowrie. *Aster Lowrieanus*,† dedicated to Mr. Lowrie by Dr. Porter, is an evidence of high esteem for contributions "to our knowledge of the flora of central Pennsylvania."

Not only did Mr. Lowrie build up his herbarium with collections from his own region, but through his acquaintance with other botanists he arranged for exchanges so that many other

* Bot. Gaz. **11**: 64. 1886.

† Bull. Torrey Club **21**: 12[illegible]. 1894.

parts of the United States are represented by specimens. The very numerous specimens collected by Dr. Porter are of particular interest, since the Porter herbarium, originally at Lafayette College, Easton, Pa., has been so severely damaged by fire.

The specimens are mounted on standard size sheets and are in good repair. In going over the collection it was found that there are 2,750 specimens. These represent 144 families and 707 genera. In addition to the mounted and classified specimens, there are a large number, perhaps a third as many more, unmounted and not incorporated into the collection. These came into our hands in the condition in which they lay on the owner's work table at the time of his death.

It may not be out of place to mention here that Mr. Lowrie's love of plants was further evidenced by the unusually attractive and extensive manner in which he converted the grounds about his house into an arboretum. These beautiful grounds filled with rare and interesting shrubs and trees, both native and exotic, occupy a space of nearly twenty acres. During the thirty-five years since the death of Mr. Lowrie this veritable park has not had the care and attention that it would have received from its originator, but even after this long lapse it is still a most remarkable place, both for its beauty and scientific interest. The wonderful afternoon which we spent there last August will not soon be forgotten, and it is our hope that this living monument may be long preserved to flourish in memory of its maker.

Frank D. Kern.

Cynosurus echinatus in Oregon.—In the February, 1920, issue of the American Botanist (Vol. 26, No. 1) attention was called to the collection of *Cynosurus echinatus* at Eugene, Oregon. It was also recorded in Torreya (Vol. 19, No. 10, p. 189). Since this species is still very rare in the United States, it might prove of interest to state in detail the conditions of its growth and occurrence. My first specimens were obtained in June, 1919, on Skinner's Butte, which is a very good station for the study of grasses; it is directly north of Eugene—between the city and the Willa-

mette River. The soil here is dry both winter and summer on the open south side. On the north side, however, is a heavy wooded area. Among the typical grass flora found on these rocky south slopes the most common species are: *Aspris caryophyllea* (L.) Nash; *Poa pratensis* L.; *Poa annua* L.; *Poa compressa* L.; *Poa scabrella* (Thurb.) Benth.; *Festuca idahoensis* Elmer; *Festuca megalura* Nutt.; *Gastridium ventricosum* (Gouan) Schinz and Thell.; *Elymus Caputmedusae* L.; *Elymus glaucus* Buckl.; *Sitanion jubatum* Smith; *Agropyron tenerum* Vasey; *Stipa Lemmoni* Scribn.; *Bromus marginatus* Nees; *Bromus hordeaceus* L.; *Bromus villosus* Forsk.; and *Agrostis Hallii* Vasey.

The plants of *Cynosurus echinatus* were on the southwest lower slope of the butte, overlooking the railroad. There were a large number of fine specimens along a dry ditch and a road which leads to the summit. They were growing thickly together, but only in this one restricted location. Last summer the number had increased, and the dead stalks of the year before could still be easily recognized.

I was greatly surprised in June, 1919, to find a few specimens also on the lower west side of Spencer's Butte, along a narrow trail, in a cleared space overgrown with grass and surrounded on all sides by dense woods. This butte is 2,063 feet high and is about six miles south of Eugene. On both buttes this grass was found in rather dry, rocky soil. Prof. J. K. Henry has included this species in his Flora of Southern British Columbia on page 37, and writes me in regard to it: "*Cynosurus echinatus* is a not uncommon introduced grass on dry hillsides or even occasionally in gardens near Victoria." He first collected it there about five years ago.

In appearance *C. echinatus* is not very similar to *C. cristatus*, which is sometimes found on parkings in Eugene. The spikelets are somewhat alike in the two species, but the awns of *C. echinatus* are long and produce a prickly or burry effect which is not present in *C. cristatus*. In the former the panicles are long and slender, while in the latter they are compact and hardly over 3 cm. long. Both species are slender and rather inconspicuous. *C. echinatus*

could not be mistaken for any of our native grasses. The only grass that grows here that even suggests it is a small dry and stunted *Dactylis glomerata*—and this an introduced species.

In order to give an idea of the occurrence of *Cynosurus echinatus* in the United States, the following list of herbarium material will indicate its scarcity:

*1. Gray Herbarium. No specimens from the United States.

*2. New York Botanical Garden, also none from the United States.

*3. U. S. National Herbarium.

California: Marin Co., 1912, *Eastwood.*

Oregon: Eugene, *Bradshaw.*

Of the four species now retained in the genus *Cynosurus* L., only two are found introduced in the United States; all are of the Mediterranean region. *C. cristatus* L. is sometimes cultivated in this country, but is of practically no economic importance. The other seven Linnean species are now referred to other genera. Hackel says in Engler and Prantl (Nat. Pflanzenf. II. 2, 73): "*C. echinatus* L. in Südeuropa, Ackerunkraut." *C. echinatus* belongs to the section *Phalona* (which Adanson made a genus), while *C. cristatus* is included in the section *Eucynosurus.* There is a good figure of *C. echinatus* in Engler and Prantl. Besides the material from the United States, the following regions are represented by collections in the U. S. National Herbarium: South America; Africa; New Zealand; Italy; France; Syria; England; Switzerland; Spain–Portugal; Austro-Hungary–Balkans; and the Canary Islands. Macoun collected it as far back as 1908 in Nanaimo, Vancouver Island.

For assistance in the preparation of data I am deeply grateful to: Mrs. Agnes Chase; Dr. J. H. Barnhart; Dr. J. K. Small; Miss Mary A. Day; Prof. J. C. Nelson; and Prof. J. K. Henry.

R. V. Bradshaw.

Eugene, Oregon.

The Boy Scouts and Conservation of Wild Flowers.—One of the subjects recently offered to scouts for merit badges is

* Duplicates of my collections are to be deposited in these herbaria.

botany. To secure this badge a scout must collect, mount and label fifty specimens of flowering plants, *without the roots.* In addition, five each of ferns, mosses, liverworts, lichens, fungi and algae must be prepared and, if possible, labeled. One of the other requirements is an essay of at least two hundred words on the conservation of wild flowers. Both the scout handbook and the merit badge pamphlet on botany emphasize the necessity of protecting plants and caution scouts not to gather rare flowers. Parts of two essays recently submitted to the editor by applicants for the Botany Merit Badge are given here as showing the understanding scouts have of the importance of wild flower conservation.

"Leave the flowers alone. Let them grow. By doing this you can help to increase the beauty of the country. Among the flowers that are being exterminated are the Jack-in-the-Pulpit, Spring Beauty, Mountain Laurel, Flowering Dogwood and Wild Pink. It will be noticed that all of these are now seldom seen near the cities and some of them seldom in the woodlands. A good rule to follow is 'Never collect one flower unless there are three seen, nor collect two unless six are seen, and never collect a root unless there are more than ten plants in the colony.'

"One of the most important works of Botanists should be the conservation of wild flowers. This is especially important in the parks and other places about cities. If people are allowed to gather as many flowers as they wish some of the rarer flowers will soon be extinct in the unprotected places. Among those flowers which are in danger of extinction is the Pink Lady's Slipper. This flower may be found in deep woods along with the mountain laurel. It is very attractive and likely to attract the attention of any passer by. The Mountain Laurel also is in danger of being wiped out, for it is gathered in great bunches by people who picnic in the mountain woods. Although it is abundant now it is being rapidly diminished."

THE EDITOR.

REVIEWS

Reinheimer's Symbiosis*

The author's thesis with regard to evolution is that everything normal and sound in organic evolution is due to biologically righteous (*i.e.*, essentially coöperative) behavior, whilst everything abnormal and pathological is due to unrighteous (*i.e.*, fundamentally predatory) behavior. This is not the place to discuss the main thesis of the book, which is not offered as a contribution to botanical literature, but this is the place to note that the book contains numerous statements about plants that are inaccurate or incorrect, and sure to mislead readers not familiar with botany. Thus on page 41 the author refers to a statement by W. C. Worsdell that "the root of the vascular plant is less prone than any other organ to deviate from the normal form," and then adds: "When we bear in mind that . . . the premier industry of the plant . . . consists in the conversion of inorganic into organic material, it seems doubly remarkable that those parts which are most busily engaged upon such industry, though ever so unobstrusively and even shut away from sunlight, are the most robust in health," etc. On page 57 the author says: "I have contended these *ten years* that there is a biological causation of disease. . . ." The italics are the reviewer's. No biologist needs to be reminded that a biological causation of disease was experimentally demonstrated by Pasteur some forty-odd years ago. On the same page we read: "Few would have imagined that the case of hay fever provides an illustration of the biological causation of disease." The very name "hay" fever indicates that such a relationship has been commonly recognized for years.

On page 58 the action of pollen in causing pollinosis is explained on the ground that its "protoplasm is so poor in food values," though it is now common knowledge that so-called "hay fever" may be caused by a great variety of proteins, such as beans, beef, cheese, fowl, fish, whole wheat and others, standing at the top of the list in food value. On the same page pollen

* Reinheimer, H. Symbiosis: A socio-physiological study of Evolution. Pp. xii + 295. Headley Brothers, London, 1920.

grains are referred to as seeds. On page 59 we read that "the large majority of the plants whose pollen give rise to hay fever are worthless weeds," yet the list of well-known offenders in this respect includes such economically important plants as cherry, clover, corn, timothy, rose, and others, and numerous trees of great importance for timber.

Chapter V, *The "intelligence" of plants,* is mainly a commentary on Maeterlinck's essay, *L'intelligence des fleurs,* which the author apparently accepts, *litteratim.* He quotes Maeterlinck's citation of the seeds of the mistletoe, juniper and mountain-ash, "which provide for their dissemination by birds and which, to entice them . . . lurk inside a sweet husk." Maeterlinck interprets this as evidence on the part of the plant, of "a powerful reasoning faculty . . . a remarkable understanding of final causes." Reinheimer (p. 87) challenges anyone "to produce a better and more rational interpretation of these phenomena"; and adds that, "the assumption is by no means fanciful that the plant is also a direct sustainer of animal intelligence. The animal takes in 'knowledge' with its food . . . 'knowledge' which is 'predigested' by the plant." In this connection, it would be malicious to note that, toward the end of the same paragraph, the author quotes Prof. John Dewey as saying that, "it is not we who think in any actively responsible sense; thinking is rather something that happens in us."

C. Stuart Gager.

Clements's Rocky Mountain Flowers*

A lady, intensely struck with the wealth of form and coloring of the Texas wild flowers, once wrote me inquiring for a book describing and illustrating this flora in such a way that she could with her all but forgotten elementary botany "spot" their names and learn more about them. I wrote her, regretting the lack of

* Clements, Frederic Edward and Edith Schwartz Clements. Rocky Mountain Flowers. An illustrated Guide for Plant-Lovers and Plant-Users. Field ed. Pp. xxxi + 392. Illustrated. The H. W. Wilson Co., New York. 1920. Price $4.50.

such a book for that section. No doubt many tourists, ranchmen and others in the Rocky Mountain region and adjacent plains have wished also for just such a book. In "Rocky Mountain Flowers," Professor Clements and his wife have, I believe, produced such a volume. There are details that might be criticized, but in a section where the wild flowers are so striking and varied in color and form, and so plentiful that they are often a dominant note in the coloring of the landscape, such a book is much to be desired, and criticisms as to slight defects in the accuracy of the color plates and in the use of such unfamiliar Latin names as Brassicaceae for Cruciferae are out of order. The reviewer, who has collected plants both as an amateur and a professional in this region, finds this volume a distinct innovation for that part of the country. The book has easily worked keys, with family and genus descriptions, and covers the wild flowers of the West from the Canadian Rockies to California and New Mexico, and as far east as the western halves of the plains states of Kansas, the Dakotas and Nebraska. Both keys and descriptions are simple enough for the beginners in high schools and colleges, for general botanists with slight taxonomic training, for tourists, and for the general lover of nature who desires to know plants and talk about them, but who has not had the opportunity, time or inclination to wade through a great mass of technical detail in order to gain the very general knowledge he desires. In this volume the general, rather than specific, aspects are emphasized, making it especially valuable for the forester and ecologist who of necessity must do much of their identification work in the field, and who must, therefore, have descriptions not difficult to apply. There are 25 full-page color plates illustrating 175 floral types in such a way that the most untrained layman would recognize them. Added to these are 355 black and white illustrations of floral "types." There is a key flower chart which should be of great help in plant identification, especially to those other than professional systematists. The book is convenient in size, very attractively bound in dark red limp leather, and contains a glossary of scientific terms.

ORLAND E. WHITE.

Clements's Flowers of Mountain and Plain*

In part this book is an abridged edition of "Rocky Mountain Flowers," in the sense that it contains the same 25 color plates illustrating one hundred and seventy-five of the most striking western mountain and plains wild flowers. There are no keys nor technical descriptions, for the volume is intended primarily for travelers and flower lovers who wish a souvenir of their trip in this region, and who desire a means of easily recognizing flowers met on tramping excursions, or seen from car windows or an automobile. Each plant illustrated is accompanied by text giving both its common and scientific names, something about the kind of place it grows in, its time of bloom, and often other facts concerning its life history which would be of general interest. For example, in many cases the edible parts of the plant are noted, while in other cases facts regarding insect pollination, stock poisoning or some ancient superstition are set down. In the reviewer's opinion, this is just the sort of book to give your unbotanical friend living in that region or who is going there on a vacation. It is compact, nicely bound and authoritative.

ORLAND E. WHITE.

Harshberger's Pastoral and Agricultural Botany†

Although issued as a textbook of agricultural botany for colleges and possibly secondary schools, this volume, from its contents, is evidently intended primarily for a very limited group of students, such as those interested in veterinary science or in range problems. The reviewer can not think of any agricultural college in which this volume could be profitably used as a regular course text. Approximately one third of the book, or nine of the eighteen chapters, is devoted to stock-poisoning plants, their distribution, their effect on stock and human beings, and the remedial measures. The remaining nine chapters consist of one on feeds and feeding, three on grasses with emphasis on their economic

* Clements, Edith S. Flowers of Mountain and Plain. 2d ed., enlarged. Pp. 79. Illustrated. The H. W. Wilson Co., New York. 1920. Price $2.75.

† Harshberger, John W. Pastoral and Agricultural Botany. Pp. xiii + 294. Illustrated. P. Blakiston's Son & Co. Philadelphia. 1920. Price $2.00.

phases, such as their importance as cereals and forage plants; two chapters emphasizing in some detail the economic value of the legume or pea family, and one chapter on the value of certain bacteria in accumulating nitrogen. This chapter (XVI) mentions the value of green manures and the failure of the preparation "nitragen" in disseminating the nitrogen bacteria. It also contains a long list of nitrogen-consuming plants, very tersely described and classified as to part of plant economically valuable. The final two chapters are devoted to weeds and weed control and agricultural seeds, seed selection and seed-testing. The author evidently considers plant breeding and genetics, plant physiology and plant diseases as subjects of too specialized a nature to include in an elementary agricultural text. So far as the reviewer can determine, they are not considered. Extensive bibliographies on each subject are given, most of the material being very accessible. Many interesting problems are touched upon. On page 219 the fertilizer waste due to the common method of sewage disposal from large cities is discussed, while on page 83 a method of desensitizing human beings against poison ivy is described. The treatment takes one month and gives immunity for one month. On pages 90–91 is a detailed account of Socrates' death by poison hemlock, taken from Plato. On page 62 the planting of garden larkspur in masses about gardens is advised by Froggat because of its poisonous nature, as a protection against locusts and grasshoppers. Other species are cited as deadly to maggots and ticks. This treatment, in the reviewer's opinion, would probably prove about as efficacious as the proverbial Frenchman's flea-powder, or the use of castor bean plants as protection against mosquitoes. On pages 15 and 82 blondes (blue eyes) are said to be very susceptible to poison ivy, while brunettes (dark, swarthy skins) are practically immune. This statement does not accord with the reviewer's experience. Among eleven blondes questioned, six, including the reviewer, were practically immune, while five were susceptible. Of six brunettes, five were susceptible and one was practically immune. On page 101 nightshade berries (*Solanum nigrum*) are mentioned as poisonous. On page 131, Pt. II, Pam-

mel's Manual of Poisonous Plants, green berries of this plant are stated to be poisonous to man, but the ripe berries have been eaten by Pammel and others with no ill effects. In South Dakota the reviewer has often seen them eaten with no ill effects. In fact, they are gathered and, after cooking, used for delicious pie filling. On page 80 two questionable statements occur regarding the castor bean, viz., "Flowers are borne in separate clusters as pistillate and staminate," "Poultry have been poisoned by eating the seeds." As well known, castor bean flowers are borne on different parts of the same flower spike. Poultry are stated to be especially immune to castor bean poisoning. (Nat'l Dispens., 2d ed., p. 1146; Pammel's Poisonous Plants, Pt. II, p. 594.) One hardly refers to the horsetail (*Equisetum*) as "this fern plant" (p. 39) in modern botanies. On page 74 loco-weed, *Aragallus lamberti*, is referred to as white-flowered in large areas in Colorado, Wyoming and Montana, while such authorities as Rydberg, Coulter and Nelson, Britton, and Gray describe the flowers of this species as purplish or violet, "rarely white" or "seldom yellowish." Rydberg and Chesnut apparently regard the white-flowered loco-weed as *Aragallus spicatus* (Hook.) Rdbg. The book is attractively bound in limp cloth and the illustrations are good.

ORLAND E. WHITE.

TORREYA

Vol. 21 — November–December, 1921 — No. 6

CAPE COD VEGETATION

Roland M. Harper

Cape Cod, which is approximately coextensive with Barnstable County, Massachusetts, being practically the northernmost extension of the Atlantic coastal plain of North America, and easily accessible from several large centers of population and scientific activity, has attracted the attention of many botanists, past and present. There are innumerable references to Cape Cod plants in taxonomic and floristic works, but, strange to say, comparatively few papers relating primarily to the flora of the Cape, and still fewer that contain illustrations of the vegetation as such or give any idea of the relative abundance of the species.

The earliest work that deserves to be cited in this connection perhaps is Thoreau's book, "Cape Cod," first published in 1865 (after the author's death), and reprinted in various editions. It gives a very general idea of the aspects of nature, but devotes more space to people than to plants, although the author was well acquainted with the New England flora.

The only paper on the land plants of Barnstable County cited in Miss M. A. Day's list of New England local floras* is a short one by Walter Deane, entitled "A Few Cape Cod Plants" (Bot. Gaz. **14**: 45–47. 1889). This relates to the vicinity of Hyannisport, on the south side of the Cape. In the next few years after the publication of Miss Day's list several important papers on Cape Cod vegetation (as distinguished from mere flora*) appeared.

Dr. Arthur Hollick, in his "Geological and botanical notes: Cape Cod and Chappaquiddick Island, Mass." (Bull. N. Y. Bot.

* Rhodora **1**: 158. 1899.

† For a discussion of the difference between vegetation and flora see Torreya **17**: 1–3. 1917.

Garden **2**: 381–407. April, 1902), gives a good account of the dune vegetation around Provincetown, at the tip of the Cape (pp. 389–397). Later in the same year Charles H. Shaw published a successional study of a different type of vegetation at the opposite extremity of the county, with several illustrations, entitled "The development of vegetation in the morainal depressions of the vicinity of Woods Hole" (Bot. Gaz. **33**: 437–450, *figs. 1–6*. June, 1902). A criticism of this a few years later by H. H. Bartlett (Rhodora **11**: 221–235. 1909) gives some additional details about the bog and marsh vegetation of that neighborhood.

Of quite different character is a valuable contribution by J. W. Blankinship on "The plant formations of eastern Massachusetts" (Rhodora **5**: 124–137. 1903). But in that Cape Cod is only a part of the area treated, and no geographical boundaries are drawn, so that a distant reader has no way of knowing just which of the plants listed grow on the Cape and which do not.

A well-known government bulletin by J. M. Westgate, "Reclamation of Cape Cod sand dunes" (U. S. Bur. Plant Industry Bull. 65, with 38 pages and 6 plates. 1904), contains a brief description of the vegetation around Provincetown, with notes on the changes it has undergone since the country was first settled. The next year appeared a somewhat similar study of a small area on the other side of the Cape, and likewise mentioning only a few species, namely, "Reforestation at Woods Hole, Massachusetts,—A study in succession," by M. A. Chrysler (Rhodora **7**: 121–129. *pl. 62, 63*. 1905).

The papers on Cape Cod plants in the next ten years were almost wholly floristic. In Rhodora for July, 1909, January, 1910, and February, 1911, are three interesting articles by F. S Collins, written in narrative style, and mostly pertaining to the flora of Eastham, on the "lower Cape" (*i.e.*, that part north of the "elbow"). A year after the last one, E. W. Sinnott published a floristic and phytogeographical paper on "The pond flora of Cape Cod" (Rhodora **14**: 25–34. Feb., 1912).

This seems to bring us down to the present time, omitting a few geological and geographical works, papers on algae, descriptions of

new species, and notes on selected species found on the Cape. None of the papers cited describe the vegetation of the Cape, except in very general or indefinite terms or for very small areas, or attempt to indicate what proportion of the total is made up by any one species. For example, it is difficult to ascertain from existing literature whether the commonest tree, *Pinus rigida*, occurs only as scattered individuals or in large forests like the pine-barrens of Long Island and New Jersey.

Before discussing the plants of the Cape it will be well to sketch their environment briefly. Cape Cod is a low but not flat peninsula, underlaid at least in part by Pleistocene strata and covered with glacial boulders, gravel, dune sand, marsh muck, etc., with a somewhat "oceanic" climate on account of being nearly surrounded by the Atlantic Ocean. It is remarkably similar to Long Island in soil, topography, vegetation, and various other features, a fact which seems to be seldom mentioned, perhaps because very few geographers have explored both areas. If one wished to go into such details, it could be divided into about five subdivisions or minor regions.* Near the mainland, on the so-called "upper Cape," hills, granite boulders, deciduous forests, orchards, and pastures are common, and the country does not look very different from some places far in the interior of Massachusetts; but toward the extremity it becomes more and more sandy and devoid of rocks, trees, and farms, and the last several miles near Provincetown are all dune formation.

Thoreau and other writers of his time describe the Cape as nearly destitute of trees, but there is considerable forest now, for two or three reasons. First, there are now railroads to bring coal from Pennsylvania, so that the inhabitants do not have to depend on wood to keep them from freezing in winter. Second, the rural population and the amount of farm land has diminished, as nearly everywhere in New England and near-by states, allowing forests to take possession of many abandoned fields.† Third, the process

* For a geographical sketch of the Cape, with bibliography, see A. P. Brigham, Geog. Review 10: 1–22. "July" [Sept.], 1920.

† See Journal of Forestry (Washington) 18: 442–452. (May) 1918.

of reforestation has been expedited in a few places by artificial planting of both native and exotic trees.

My first visit to Cape Cod was made in October, 1920, under very favorable circumstances. My life-long friend Clarence H. Knowlton, of Hingham, Mass., an amateur botanist and a frequent contributor to Rhodora, was about to make a business trip in his automobile the whole length of the Cape, and invited me to accompany him. In three days, the 13th, 14th and 15th, we passed through every one of the fifteen towns in Barnstable County, and as the roads were practically all of smooth asphalt, and our speed seldom exceeded 25 miles an hour, I was able to make legible notes practically every mile of the way. Although I had to keep my eyes on my notebook about half the time, and thus might have missed many interesting plants, Mr. Knowlton, who was already familiar with the ground, often called my attention to them. When he stopped in the towns, sometimes for an hour or more, I usually walked ahead and examined the vegetation near the road until overtaken; and at the more interesting places we both got out to reconnoiter.

In this way I secured a reasonably accurate census of the existing vegetation of the whole county, aside from the rarer species, those not recognizable in October, those chiefly confined to beaches and marshes, and the bryophytes and thallophytes (which, however, like the rare species, make up a very insignificant proportion of the total bulk of vegetation). But my notes are of course not complete enough yet for any one of the five or more geographical subdivisions (still less so for different habitats) to warrant treating them separately here; so that the following list is to be regarded as an average analysis of the native and naturalized plant covering of the whole Cape.

It is divided into trees, woody vines, shrubs, undershrubs, and herbs, and the species in each group arranged in approximate order of abundance, beginning with the most abundant (as has been my wont for about 15 years past), and omitting those seen only once. The names of evergreens are in heavy type, and of species believed not to be indigenous in parentheses. The normal mode of dissemi-

nation, where known, is indicated by more or less suggestive letters after the names, as follows: O, berries or other fleshy fruits; Q, acorns or other nuts; T, "tonoboles," a term coined by Clements to indicate plants with small dry seeds in erect capsules or receptacles borne on stiff stems which may be set in motion by the wind or passing animals; X, barbed fruits; and Y, wind-distributed fruits or seeds. (To get the proper sequence read the left-hand columns first.)

TREES

Pinus rigida Y
Quercus coccinea Q
Quercus alba Q
Acer rubrum Y
Quercus velutina Q
(*Robinia Pseudo-Acacia*) Y
Juniperus Virginiana O
Chamaecyparis thyoides
Betula populifolia Y
Nyssa sylvatica O
(*Prunus serotina*) O
Quercus stellata Q
Pinus Strobus Y
(*Populus alba*) Y
(*Sassafras variifolium*) O
(*Prunus Virginiana*) O

WOODY VINES

Smilax rotundifolia O
Rubus hispidus O
Vitis Labrusca? O
Rhus radicans O

SHRUBS

Gaylussacia baccata O
Quercus ilicifolia Q
*Comptonia peregrina**
Myrica Carolinensis
Prunus maritima O
Clethra alnifolia T
Rhus copallina O
Rhus typhina O
Viburnum dentatum O
Spiraea latifolia T
Rhus Vernix O
Vaccinium corymbosum O
Ilex glabra O
Viburnum cassinoides O
Rosa sp. O
Spiraea tomentosa T

* This appears to be absent from the dune area around Provincetown.

Undershrubs

Arctostaphylos Uva-ursi ( )
Hudsonia tomentosa
Hudsonia ericoides
Corema Conradii*

Natural opening full of *Hudsonia tomentosa* and *Cladonia* sp. (both small slow-growing plants) in small barren sandy hollow in northern part of Yarmouth. Trees nearly all *Pinus rigida*. Oct. 13.

Herbs

Andropogon scoparius Y
Pteris aquilina Y
Ammophila arenaria Y
Ionactis linariifolius Y
Deschampsia flexuosa Y
Baptisia tinctoria Y
Carex Pennsylvanica
(*Daucus Carota*) X
Lysimachia quadrifolia
(*Agrostis alba*?) Y
Solidago odora Y
Scirpus cyperinus Y
Chrysopsis falcata Y
(*Ambrosia artemisiifolia*)
(*Asclepias Syriaca*) Y
Scirpus Americanus
(*Plantago lanceolata*)
Euthamia tenuifolia Y
(*Leontodon autumnalis*) Y
Eriophorum Virginicum? Y

* Comparatively little has been published about the occurrence of this rather unique plant on Cape Cod. G. B. Emerson, in his classic report on the trees and shrubs of Massachusetts (1846), had no record of it from east of Plymouth, but Thoreau found it about that time in Provincetown and near Highland Light in Truro. J. H. Redfield, in summing up the known distribution of the species in 1884 (Bull. Torrey Bot. Club 11: 99), stated that Dr. Watson had seen it near Truro and one of the coves of Buzzard Bay. Dr. Hollick reported it from Provincetown in 1902 in the paper cited, and Mr. Collins (Rhodora 11: 128. 1909) mentioned it as frequent and showy in spring in Eastham. Mr. Knowlton showed me a considerable quantity of it beside the main road in the northern edge of Eastham.

Pinus rigida is at present more abundant than all other trees combined, and although some of it is known to have been planted, it is safe to assume that it was always the Cape's commonest tree. Evergreens are therefore in the majority among the trees. The great difference in evergreenness between shrubs and undershrubs is noteworthy, and probably due to the same cause as in Michigan, namely, the latter are protected by snow in winter.* Most of the vines and shrubs have berries, while wind-borne seeds are in overwhelming majority among the herbs. Tonoboles are nearly as scarce as in northern Michigan,* and barbed fruits rare and chiefly

Barren sandy plains in north edge of Eastham, with stunted *Pinus rigida* (mostly about six feet tall), and in the foreground *Corema*, which however does not show very plainly, because the light was poor. Oct. 14.

confined to weeds.

Persons familiar with Long Island vegetation will recognize at once that nearly all of these plants grow also on that island, with approximately the same relative abundance. Most of them are common also as far south as the mountains of Georgia. A list of plants common in the interior of New England and rare or absent on the Cape would be a long one, but the following are the most

* See Bull. Torrey Club **45**: 41. 1918.

conspicuous examples among the woody plants that occur to me: *Pinus Strobus, Tsuga, Juniperus depressa, Hicoria, Betula* spp., *Alnus, Fagus, Castanea, Quercus montana, Ulmus, Liriodendron, Rhus glabra, Tilia, Fraxinus.* (Where a generic name stands alone it means that no species of that genus is common on the Cape.)

Most of these probably prefer richer soils than the average of those on Cape Cod, while a few are partial to rocky places. The climate may be a little too warm for *Pinus Strobus,* for that is also comparatively scarce in Connecticut and almost unknown outside of cultivation on Long Island. Although I have not visited the Cape in spring, I would expect to find most of the handsome spring flowers that are characteristic of rich shady woods nearly throughout the eastern United States rare or absent there too.

Although few species may be added to the known flora of Cape Cod hereafter by floristic botanists, and most of the vegetation has been more or less altered by civilization, there are still many problems in plant sociology, demography, geography, and ecology there that will amply repay investigation by persons interested in such matters.

OBSERVATIONS ON THE SPORES OF *SCHIZOPHYLLUM COMMUNE*

J. F. Adams

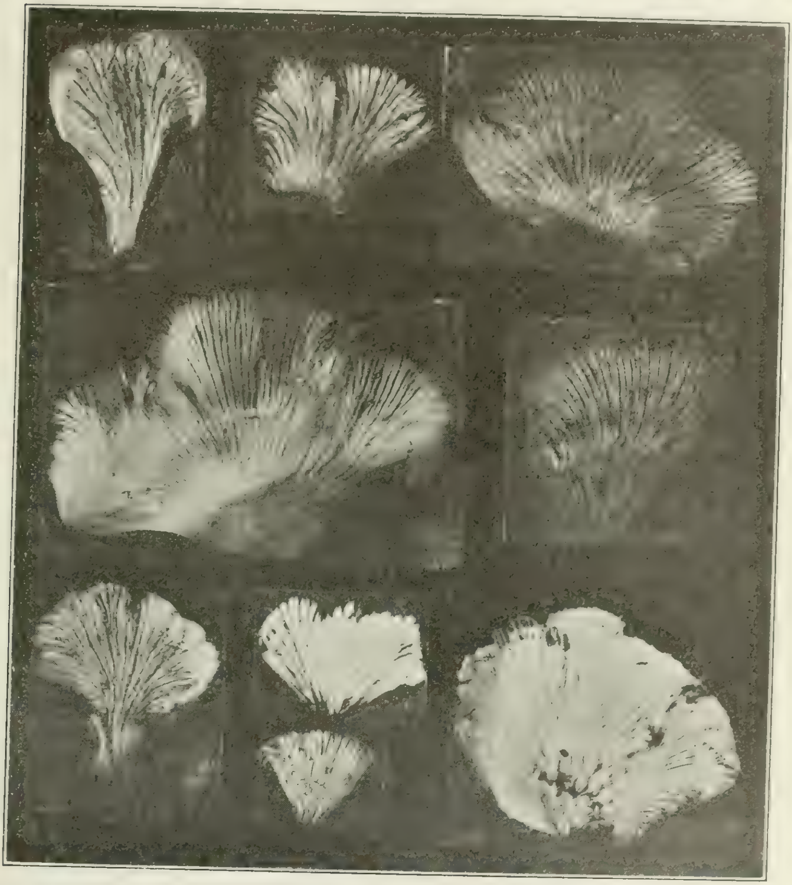
This cosmopolitan fungus is classified in the white spore group of agarics. The hymenium appears to vary in color apparently depending on age. Young sporophores have flesh-colored hymenia, while in the more mature the color may be white to purplish cinereous.

In 1917 I* observed in cultures of mature sporophores that where the spores were shed in mass upon the agar surface they were pink or distinctly salmon in color. The mass of spores making forty spore prints from material collected in the field.

* Mem. Torrey Bot. Club 17: 326–333. 1918.

appeared slimy and so striking in color that at first it was thought to be a contamination of some bacterial growth.

This year I have had opportunity to support this observation by The material was secured at various times from sporophores growing on a beech stump. The successful contrast for color of the



spores as well as spore prints was obtained on black glazed paper. A number of spore prints from sporophores of various ages is shown in the figure.

The sporophores were placed upon the black glazed paper under bell jars at room temperature. In order to secure a perfect print it is necessary to select sporophores which will lie flat on the paper.

When the hymenium is concave the part not touching the paper fails to show a perfect impression of the lamellae.

Sporophores collected in January and February in a frozen condition were most favorable material for spore prints. The frozen sporophores under room temperature thaw out quickly and in four hours a light spore print is obtained. In twelve to twenty-four hours a heavy spore print would be made. The heavy spore prints brought out the dominant pink or salmon color of the spore mass. Material collected in March, but which had become dried out several times with exposure, was not so favorable for spore prints. Such sporophores collected early in the morning and still moist would not show spore prints until after eight or ten hours at room temperature. Attempts to secure spore prints at higher temperature, such as over a steam radiator, were negative. It would appear that a gradual drying is the condition favorable for spore discharge rather than sudden drying out.

The use of black glazed paper was found most favorable for demonstrating spore prints as well as the pink color of the spore mass. The characteristic split lamella is well illustrated by the spore prints. With respect to the color of the spore mass, this agaric would appear to be related with the rhodosporae rather than the leucosporae.

Since this fungus is so cosmopolitan material can be secured for class demonstration at times when field agarics are not available.

SHORTER NOTES

Another Sonchus for America.—The genus *Sonchus* is not known to be native in the Western Hemisphere. There are nearly fifty species known from the Old World, and only three—all rather coarse weeds—have heretofore become widely naturalized in America. A fourth species is locally naturalized in southern California. Last summer, however, a fifth species, *Sonchus uliginosus,* a native of southern Russia, was found established in fields in Northampton County, Pennsylvania. We have specimens, preserved in

the herbarium of The New York Botanical Garden, collected near Hecktown, Pennsylvania, by Eugene A. Rau, July 21, 1921.

John K. Small.

A High-School Flower Show.—On September 30, October 1 and 2 the high schools of New York City held a flower show at the American Museum of Natural History that was in some respects unique. The show, intended to stimulate interest among high-school pupils in wild and cultivated flowers, was in charge of the Biology Teachers' Association. Over twenty high schools cooperated. In some schools the pupils brought the flowers to the school on Thursday morning and an exhibit was arranged in the school for the day, the flowers being sent to the museum after school. Much of the work of arranging the exhibits, as well as the collecting of material, was done by pupils. In addition to the display of dahlias and other cultivated flowers; of asters, golden rods, grasses, fall berries and foliage; fruits and vegetables from home and school gardens; there was an attractive display of posters made by pupils in the various schools. As was to be expected, the finest show was made by schools in the outlying parts of the city, Jamaica and Newtown High Schools having especially attractive exhibits. Those in charge of the show consider it to have been of sufficient value to their pupils to warrant making it an annual event.

G. T. Hastings.

PROCEEDINGS OF THE CLUB

Meeting of April 27, 1921

The following were proposed for membership and afterwards elected:

Miss L. F. Allabach, Pittsburgh, Pa.; Miss Mary L. Mann, New York City; Mr. C. C. Whedon, New York City.

Announcement was made of the death on January 14, 1921, of Prof. E. T. Harper, of Geneseo, Illinois.

The scientific program consisted of three papers:

Miss L. O. Gaiser discussed the "Method of Cell-division in Pollen-mother Cells of Plants." Her study was based chiefly upon processes observed in *Anthurium*.

Dr. Michael Levine considered "The Relation of the Host Plant to the Size of the Crown Galls of the Beet." He illustrated his discussion with views showing the size and different forms of crown gall observed. The fact chiefly emphasized was that the largest tumors develop on the largest and most vigorous hosts. Plants well nourished, especially if on enriched soil, suffer severely.

Mr. C. A. Schwarze discussed "Cleavage Processes in the Sporangia of Certain Fungi." The spore formation in *Olpidiopsis* was carefully described and illustrated. Cleavage furrows cutting outward from a central vacuole cut up the protoplasm into spores. The method of spore formation by means of cleavage furrows was described for *Circinella minor, Sporodinia grandis,* and *Mucor racemosus*, and compared with the method of spore formation by cleavage furrows in *Olpidiopsis* and *Saprolegnia*. It was shown that in all the forms studied the cleavage is progressive. The formation of the columella in the Zygomycetes was accounted for in a manner differing from that described and illustrated in some of our standard textbooks.

Meeting of May 10, 1921

Mr. Leroy Jeffers gave an illustrated lecture on "Mountaineering in the Pacific Northwest, with especial reference to the flora of Mount Rainier." He showed an extensive series of views of magnificent mountain scenery, largely of alpine meadows and glaciers. Detailed views of plants were shown, or more usually views of these massed in their native settings. Lupines, Rhododendrons, Cassiope, Castillejas, Xerophyllum, were some of the most interesting. The speaker had climbed many peaks of the Northwest and his photographs were excellent in technique.

Meeting of May 25, 1921

The meeting of the Torrey Botanical Club was held jointly with the Wild Flower Preservation Society at the Mansion, New York Botanical Garden.

The following were elected to membership: Miss Margaret Chapin, Brooklyn, N. Y.; Dr. Philip A. Munz, Pomona College, Claremont, Calif.; Dr. George M. Reed, Brooklyn Botanic Garden, Brooklyn, N. Y.

A report was presented by the Secretary showing that our effort to raise by subscription $1,000 before May 1st, in order to obtain a conditional gift of $1,000, had been completely successful. Thanks to the interest of ninety-four members and friends, we were then assured of $2,094.63. This Special Fund for the support of the publications of the Torrey Botanical Club furnishes timely and most appreciated support.

As further gifts to the Club, mention may be made of the fact that this year, from May to December, the secretary and treasurer are offering their services *gratis*. Our editors have always served without stipend, a long-continuing donation of value.

Dr. J. N. Rose read the President's proclamation setting apart the week of May 22–28 as Forest Protection Week. Dr. M. A. Howe offered the following resolution which was approved and adopted by the Club:

"The Torrey Botanical Club heartily indorses the action of the President of the United States in setting apart the week beginning May 22, 1921, as Forest Protection Week. In addition to the obvious economic waste and the menace of future timber shortage caused by destructive and preventable forest fires, the Torrey Botanical Club sees in them also a source of irreparable damage to scenic beauty and to many of the most interesting and attractive elements in our native flora. The Club pledges its best efforts to create and maintain public sentiment that will lead to the effective preservation of the forests of America."

The address of the afternoon was a discussion by Prof. William L. Bray of "The Native Vegetation of New York State." This considered the development of the plant life and was well illustrated by lantern slides.

Meeting of October 11, 1921

The following persons were proposed for membership and afterwards elected: F. H. Baldwin, New York City; Augustus O.

Bourn, New York City; Kenneth R. Boynton, New York City; James Alfred Crawford, New York City; Mrs. John Ross Delafield, Riverdale, New York City; Prof. E. J. Durand, University of Minnesota, Minneapolis, Minn.; Miss Bessie Goldstein, New York City; Prof. Arthur de Jaczenski, Perspective Anglaise 29, Petrograd, Russia; Mrs. A. C. Langmuir, Hastings-on-Hudson, N. Y.; Miss Ruth Langmuir, Hastings-on-Hudson, N. Y.; Miss Dorothy O. Miller, Brooklyn, N. Y.

Since the date of the last meeting the Club has lost by death Mr. H. A. Cassebeer, Jr., of Steinway, Long Island, and Mr. George V. Nash, Head Gardener of the New York Botanical Garden.

The scientific program of the evening consisted of informal reports on the summer's botanical work and observations.

Dr. Roland M. Harper told of observations in Florida, Alabama, Virginia, Pennsylvania, New Jersey, New York, and Connecticut. In Florida he determined the proportion of ash in *Tillandsia usneoides*, which, being an epiphyte on trees, might be supposed to be unfavorably situated for taking up mineral substances. The ash, however, was found to constitute from 3 to 5 per cent of the dry weight, which is about the same percentage as in many other plants. In the central part of Alabama he noted *Sarracenia rubra* and other bog plants previously known only near the coast. In a canoe trip down the Warrior River, *Hymenocallis coronaria*, not included in Small's Flora of the Southeastern United States, was observed. On Lookout Mountain a variety of *Sarracenia flava* was found growing in wet crevices of rocks, an unusual habitat.

Mr. A. T. Beals spoke of experiences on Long Trail, which runs north and south in Vermont along the main crest of the Green Mountains. On Camel's Hump he collected *Blindia acuta*. He found *Dryopteris fragrans* on the "Nose" of Mt. Mansfield and was impressed by the alpine gardens of *Sphagnum* and *Polytrichum* at that point. Later, about the base of Mt. Royal, in Montreal, he noted *Epipactis viridiflora*, and near the Lake of the Trembling Mountain, about a hundred miles northwest of Montreal, he found beautifully fruiting specimens of *Leucobryum*

glaucum, which were exhibited. On a more recent excursion to Staten Island the minute mosses *Nanomitrium Austini* and *Ephemerum spinulosum* were among the plants collected.

Mr. W. W. Eggleston told of a field meeting with the Vermont Botanical Club at Willoughby Lake in July and of finding *Woodsia glabella*, *Woodsia alpina*, *Asplenium viride*, *Dryopteris Goldiana*, *Polystichum Braunii* and *Botrychium simplex*. In the spring he made a visit to the mountains of southwestern Virginia to investigate for the Bureau of Plant Industry three plants that were suspected of being poisonous to cattle. These were *Delphinium tricorne*, *Bicuculla Cucullaria*, and *B. canadensis*. The first two were found to be very poisonous, the last slightly so. In the case of *Bicuculla Cucullaria* most of the poison seems to be in the bulbs, which are commonly lifted with the foliage by cattle, but are left in the ground by nibbling sheep.

Messrs. Raymond H. Torrey and C. C. Whedon reported that *Bicuculla Cucullaria* is still to be found in the northern part of Manhattan Island.

Professor R. A. Harper had noted a peculiar *Aecidium* on *Bicuculla* in Van Cortland Park.

Professor Tracy E. Hazen spoke briefly of an undescribed genus of filamentous fresh-water green algae related to *Uronema*. It was found first in greenhouses in New York and later in a ditch at Englewood, N. J. The past summer he had collected it also in pools at Burlington, Vt., and Woods Hole, Mass. One peculiarity of a second species of the genus is a periodic rotation of its lobed chloroplast, this movement occurring night and day, and being apparently independent of light conditions.

Professor R. A. Harper reported the occurrence of *Pediastrum triangulum* in plankton of Devil's Lake, North Dakota, which is being studied by Dr. George T. Moore. It had previously been known only from Germany.

Miss Anna Runge mentioned finding luxuriant masses of *Habenaria lacera* and *Calopogon pulchellus* on Marthas Vineyard.

Miss Dorothy Oak referred to the occurrence of two species of *Drosera* in the town of Orleans on Cape Cod.

INDEX TO VOLUME TWENTY-ONE

(The names of species and varieties described as new and of new combinations are in **bold face type.**

Names of contributors to the Special Fund for the Support of Publications listed on pages 70 and 71 are not indexed. The Plants of Burnham's and Latham's Flora of the Town of Southold, pages 1–11, 28–33, are also omitted from the index.)

TORREYA

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John Torrey, 1796-1873

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LOCAL FLORA NOTES—STATEN ISLAND*

By Arthur Hollick

Staten Island, or the Borough of Richmond of Greater New York, has been so thoroughly explored that recorded additions to its flora in recent years have been very few; and the growth of the community during the same time has probably resulted in the total or partial extinction of as many native species as have been added. On the other hand the advance of civilization has brought with it a number of alien species, some of which have become permanent elements in the local flora. In this connection two restricted areas have enlisted my interest and attracted my special attention during a little longer than the past decade One of these, on and in the vicinity of Todt Hill, is an area that has undergone relatively little change in its natural environment for several generations other than its modifications due to the development of the golf links of the Richmond County Country Club. The other, in the vicinity of Arlington station on the North Shore branch of the Rapid Transit Railroad, has been completely changed from its natural conditions by commercial developments.

The Todt Hill area possesses geological as well as botanical features of interest, and the two are closely interrelated. When the continental glacier of the ice age reached Staten Island in its advance from the northwest it was unable to surmount the highest point immediately north of Todt Hill, and flowed around its flanks to the east and west, leaving unglaciated a small portion of the ridge of serpentinoid rock in the form of a conspicuous morainal embayment or sinus. This is the Todt Hill area, and is the only area on the serpentinoid ridge in which the sub-surface and most of the surface soil is composed of the disintegrated underlying rock. It is largely an undisturbed mag-

* Presented at the meeting of the Torrey Botanical Club, October 26, 1921.

nesia-iron soil, formed in place, and it supports a characteristic native flora which has been so frequently mentioned and discussed that only incidentalreference to it here is necessary. Among its most conspicuous elements are *Cerastium velutinum* Raf., *Silene Caroliniana* Walt., *Viorna ochroleuca* (Ait.) Small, *Arabis lyrata* L., *Prunus Americana* Marsh., *Viola pedata* L., *Asclepias verticillata* L., *Acerates viridiflora* (Raf.) Eaton, *Houstonia coerulea* L., and *Ionactis linariifolius* (L.) Greene.

Among the introduced trees and shrubs that have become permanently established in the area, but which are rare or wanting elsewhere on Staten Island, may be mentioned *Salix fragilis latifolia* Anders., *Alnus Alnus* (L.) Britton, *Philadelphus coronarius* L., *Opulaster opulifolius* (L.) Kuntze, *Prunus Mahaleb* L., *Cytisus triflorus* L'Her., and *Ptelea trifoliata* L. These doubtless originated from garden waste, but the first two and the one last mentioned have spread quite extensively by seed. About five or six years ago *Hypochaeris radicata* L. first made its appearance on the golf links and since then has become a troublesome weed. *Solanum Carolinense* L. has also appeared recently, associated with the species last mentioned; but both species are rare elsewhere on the island. *Helianthus mollis* Lam., a species new to the Staten Island flora, was found for the first time this year, represented by a few thrifty specimens on Todt Hill. This is a species introduced from the West, previously recorded from four more or less widely scattered localities within the local flora range—at Tinicum, Delaware Co., Pa., Pestletown, N. J., and Garden City and Manhassett Neck, Long Island.

The area at Arlington covers about half a square mile of territory. Its foundation, at tide level, is natural salt meadow, on which has been built up a superstructure, to an average height of about fifteen feet, composed of waste material of all kinds, including garbage, street sweepings, ballast from vessels, mud and silt dredged from the adjacent water-ways, refuse from freight and cattle trains, etc., and a surface of ashes and cinders from the railroad and nearby factories.

My first visit to this area was made in 1908, when the following introduced species, new to the flora of Staten Island, were collected: *Holcus halepensis* L., *Capriola Dactylon* (L.) Kuntze, *Eragrostis major* Host., *Cyperus compressus* L., *Cyperus rotundus* L., *Chenopodium anthelminticum* L., *Salsola pestiger* A. Nelson,

Amaranthus deflexus L., *A. spinosus* L., *Lepidium medium* Greene, *Sinapis alba* L., *Cleome spinosa* L., *Pedicellaria pentaphylla* (L.) Schrank, *Sesban macrocarpa* Muhl., *Chamaesyce hirta* (L.) Millsp., and *Sesamum Indicum* L.—elements in the vegetation of the Old World, Tropical America, and the southern and western United States, some of which might be expected to become permanent and, perhaps, undesirable residents.

From time to time the area was subsequently visited and carefully explored, in order to note which of the species had persisted, which had disappeared, and what others new to Staten Island might have been introduced. In 1910 only five of the species previously listed were found; but it is of interest to note that one of these was *Sesamum Indicum*, a native of Asia and Africa. In 1917 this species was still there, and *Melochia corchorifolia* L. and *Anoda triangularis* (Willd.) D.C. were added to the list. In 1918, I was able to find only four of all the species listed, viz. *Chenopodium anthelminticum*, *Amaranthus spinosus*, *Lepidum medium*, and *Sinapis alba;* but the following new-comers were noted: *Rumex Mexicanus* Meissn., *Chenopodium lanceolatum* Muhl., and *Helianthus petiolaris* Nutt. My last visit was made in September 1921. It was evident that the elimination of species unsuited to the environment was almost complete, and that a vegetation destined to become permanently established there, represented by a relatively few dominant elements, was now the salient feature of interest in the area. Thrifty young trees of *Populus candicans* Ait., *Populus deltoides* Marsh., *Salix alba* L., *Betula populifolia* Marsh., and *Ailanthus glandulosa* Desf. were growing there; but the most conspicuous feature was the dense stands of *Oenothera biennis* L. and *Helianthus annuus* L. One patch of the latter covered about a quarter of an acre, to the almost total exclusion of everything else—the growth was so close and dense. Elsewhere the mass of the vegetation was made up of our common waste land and garden weeds and coarse grasses. Incidentally the following introduced species new to the Staten Island flora were collected: *Persicaria persicarioides* (H.B.K.) Small, *Pleuropterus Zuccarinii* Small, and *Helianthus hirsutus* Raf. The first one, so far as I am aware, has not heretofore been recorded growing in our local flora range, and the last one is recorded from the range only from Northampton and Monroe Counties, Pa.

FLORA OF PORTO SANTO

By T. D. A. Cockerell

Porto Santo is one of the Madeira Islands, far out in the Atlantic west of Northern Africa. From the mountains near the eastern end of Madeira it is easy to see Porto Santo, less than thirty miles away. The smaller island was first inhabited, and there is a legend that Madeira was found because it was noticed that clouds persistently hung on the western horizon. The story is not very plausible because on any fine day the rocks of Sao Laurenco, the nearest point of Madeira, are very plainly visible from Porto Santo. The island of Porto Santo is about six and a half miles long, and three miles across at the broadest point. There are several hills or small mountains, the highest having an altitude of 1660 feet. The town (Villa Baleira or Whale Town) is old enough to have once been the residence of Christopher Columbus, whose house is still standing. The island is bare and xerophytic, strongly contrasting with the greater part of Madeira, which is much moister and more covered with vegetation. The whole archipelago is volcanic and the rocky surface is extremely rough. In Porto Santo and the Eastern end of Madeira there is a great deal of sand, containing innumerable fossil land shells of Pleistocene age. In former times, as is clearly indicated by marine soundings, Porto Santo must have been several times larger, yet not so large as Madeira. Fragments of this former extension remain as islets, the largest of which are Lime Island (Ilheo de Baixo) and the Lighthouse Island (I. de Cima). These islets, though nearly all within rifle shot of the main island, have peculiar snails and beetles found nowhere else. Thus on the Ilheo de Cima there occurs in abundance a very distinct and remarkable species of land snail, *Geomitra turricula* Lowe. This may be taken to indicate that for a long period there has been great stability of level. A very slight degree of elevation would have connected Cima with the mainland, and allowed *G. turricula* to pass. A very limited depression would have submerged the islet and destroyed the snails.

To the naturalist Porto Santo is chiefly remarkable for the extraordinary series of endemic land shells. There are 42 native species of helicoid mollusks, (a few now extinct,) as

against 37 for the much larger island of Madeira. These include very diverse forms belonging to a series of genera and sub-genera. Perhaps nowhere else in the world is such a concentration of species of these animals. Marine fossils of Miocene age occur in Porto Santo, but the snail fauna must be older than the Miocene. Its affinities are with the genera of Europe, but however it may have reached the island it has long been isolated. Its history as an insular fauna must surely date from the Eocene or even late Mesozoic.

When we compare the flora with the snail fauna the contrast is extreme. The recorded terrestrial vascular plants, excluding those only in cultivation, number 315 species. Of these, 257

No. 1.—View from Villa Baleira. The conical peak is Pico do Castello. The double peak, more to the right, is Pico de Facho, the highest point in the island.

are dicotyledons, 48 monocotyledons, 2 gymnosperms, and 8 vascular cryptogams. To this list I can add one more, *Adonis microcarpa* DC. (*cupaniana* Guss.), which I found in a field near the Fonte d' Areia on the north side of the island. I determined it by comparison with specimens at Kew. The genus is new to the Madeira Islands, but it has undoubtedly been introduced. The species is known from North Africa, the Canaries, Portugal, Syria, etc. This flora presents very few endemic elements and these are in general of such a character as to indicate recent

segregation, presumably as recent as the Pleiostocene in most cases. Is there then no Eocene or Mesozoic flora, to correspond with the series of snails? It is perhaps represented by the dragon tree, *Dracaena draco* L., which is now extinct on Porto Santo, though once common. This remarkable plant occurs only in the Madeira and Canary Archipelagoes. Whether the Porto Santo form differed from that of Madeira in any small particulars, we shall never know. Whatever plants there might be, whose isolation dated as far back as that of the snails, might be expected to be woody, either trees or shrubs. One such might be *Sideroxylon marmulano* Lowe,* a Sapotaceous shrub peculiar to the Madeira Islands, and now very rare. Mr. A. C. de Noronha detected it on the I. de Cima, Porto Santo, but it was originally described from various places on the Island of Madeira. The remarkable thing about it is, that it belongs to a tropical and subtropical group according to present day distribution. On looking at the geological record, however, we find that in mid-tertiary times the genus existed in central Europe (*S. putterlicki* Unger), and a related species has been described by Berry from the Eocene of Tennessee. It appears, however, that the really ancient flora has almost totally disappeared, the snails have survived in abundance where the plants could not. The endemic or precinctive plants are few and not specially remarkable. I find the following recorded:

(1.) *Fumaria laeta* Lowe, an annual which is so near to *F. muralis* that Lowe at first described it as a variety. It was found on the summit of the Pico de Facho, the highest point on the island, and it is possible that the seed of its ancestor was conveyed hither by birds. On the top of the same peak was found a small European snail, *Balea perversa*, which ordinarily inhabits trees, and is known to have very adhesive slime. It seems undoubtedly to be carried from tree to tree by birds, and I do not doubt that it reached Porto Santo, where it is a quite isolated type, on the feet of migrating birds. The central European Coccid *Ortheziola vejdovskyi* Sulc which I found on grass roots on the Portella Pass in Madeira, may be supposed to have come in a similar manner, the young larvae clinging to a bird. In J. Y. Johnson's list of Madeira birds, no less than 70 species are given as visitors or stragglers to the islands.

* Misspelled in various works mermulana and mirmulans.

(2.) *Cheiranthus arbuscula* Lowe, a shrubby species with lilac flowers, related to two species found in Madeira. Webb and Berthelot placed plants of this type in a genus *Dichroanthus*, the name evidently from the fact that in some of them the flowers change color.

(3.) *Lotus floridus* (Lowe) Masf., with f. *sulphurea* (Lowe) having the flowers pale sulphur or straw color instead of orange and brown as in the type. I saw only the typical form which occurs in abundance. This is a silky gray or villous plant now usually regarded as a local form of *L. glaucus* Aiton of Madeira.

No. 2.—View from Villa Baleira, showing two date palms. The palms do not bear edible fruit on the Madeira group. The island near the center is Ilheo de Cima, on which the light-house stands.

Lowe found *L. glaucus* in one place on Porto Santo, and also an intermediate form. It has latterly been assumed that *floridus* is only a xerophytic stage of *glaucus*, but the fact seems to need experimental demonstration. Lowe's intermediate may have been a hybrid, and it is significant that at least some *glaucus* retained its characters in Porto Santo. *L. floridus* occurs also on the islets Cenouras and Nordeste, off Porto Santo.

(4.) *Lotus loweanus* Webb, flowers dark dull blackish purple. The Index Kewensis gives this only from the Canaries, but this is a mistake. It is peculiar to Porto Santo, where it was discovered by Webb and Lowe in 1828.

(5.) *Saxifraga portosanctana* Boiss. Related to *S. maderensis* Don., from Madeira, but perhaps even more closely to *S. cuneata* Willd. from the Iberian Penninsula.

(6.) *Galium geminiflorum* Lowe, a small annual closely related to one described from the Grecian Archipelago.

(7.) *Limonium pyramidatum* (Lowe, as *Statice*). So close to *L. ovalifolium* (Poir.) O. Ktze. that Menezes treats it as a variety. It is however the only *Limonium* in the archipelago, though *Statice maderensis* (Lowe as *Armeria*) occurs in Madeira.

Not one of these seven endemics could be suspected of belonging to the really ancient flora, and all may be supposed to have been derived from ancestors which came across the sea, the seeds perhaps carried by birds. They may date from the Pleistocene, or at the earliest Pliocene, I should suppose.

The Azores have nearly 40 species of endemic vascular plants, but not one of these belongs to any one of the genera represented by the Porto Santo endemics. This may be explained by the rare and accidental character of the introductions providing the stock from which these plants developed.

The three Desertas islands, in plain sight from Porto Santo, have 138 species of vascular plants, with 113 dicotyledons, 20 monocotyledons (all grasses except a *Carex* and an *Asphodelus*), 3 ferns and a *Selaginella*. Two of the ferns are the common brake and maiden hair. The little flat island called Chão, the northernmost of the group, has 1 endemic species, the grass *Lolium loliaceum* (*Arthorchortus loliaceus* Lowe, *Lolium lowei* Menezes). The southern Deserta, called Bugio, is the only known locality for *Chrysanthemum* (*Argyranthemum*) *haematomma* Lowe. Thus the two endemics of the Desertas are of different genera from those of Porto Santo and also from all the endemics of the Azores.

When we catalogue the Porto Santo flora, deriving our data from the excellent "Flora do Archipelago da Madeira" by C. A. de Menezes (1914), it becomes very evident that a large proportion of the species now existing there consists of introduced weeds, or cultivated plants run wild. One gets the impression that all the "tramp" plants of southern Europe are there. Going through the list I find about 160 species (out of a total of 316) which may I think certainly be referred to this category, and perhaps 20 or 30 others might be included. But this

statement is inadequate to convey the correct impression, for the dominance in individuals of these "tramps" certainly far exceeds their numerical proportion as species. The most barren locality I found was the top of the Lime Island (Baixo), where even the xerophytic *Artemisia argentea* L'Herit, so characteristic of the I. de Cima, seems to be wholly absent. A group of nettles (*Urtica membranacea* Poir.) afforded food for the larvae of the beautiful butterfly *Pyrameis indica occidentalis* Feld.

On the dangerous cliffs of the west side, Miss Nâncy Paterson, a member of our party, found the typical red-flowered *Anagallis arvensis* L., a matter of interest since the ordinary form throughout Porto Santo and Madeira is the blue-flowered *A. caerulea* Schreb. Here and there, on the top of Baixo, is a sorry-looking plant of *Nicotiana glauca* Graham; but our guide Juan de Pico explained that he had introduced the species there several years ago. On the north slope of the Pico do Castello, on the main island of Porto Santo, we found the only orchid, *Gennaria diphylla* (Lk.) Parl, in good flower. It appears to be truly native but the minute seeds were probably brought by birds in comparatively recent times.* The top of Pico do Castello is planted with trees (especially *Pinus pinaster* Sol.), which are tended with some care under the impression that they will produce rain. Tamarisk (*Tamarix gallica* L.), though not cited for Porto Santo by Menezes, is abundantly planted about the town and along the sea front, where it doubtless has utility in controlling the drifting sands. There is great need for a really good xerophytic fuel-plant and I believe that the introduction of the mesquite (*Prosopis*) would be a great boon to the inhabitants. The species of *Mesembryanthemum* (*crystallium* L., *nudiflorum* L., *edule* L.) are very conspicuous everywhere. Sometimes when hunting snails I would inadvertently kneel on one of these plants; it was as if I had kneeled in a pool of water. The reader will perceive that there are several things to remind one of Southern California, and indeed we often thought of the resemblance.

My wife and I were two weeks in Porto Santo, during which time we were entirely cut off from the rest of the world. There

* No one has been able to point out any distinctive peculiarities in the Porto Santo form, but I do not know whether it has been critically investigated. I have placed specimens in the U. S. National Museum.

is no means of communication by telegraph or wireless, and the town, Villa Baleira, seems to be little altered from the time when Columbus walked its streets and married the daughter of the governor. Only Portuguese is spoken, and we should have had a difficult time but for our friend Miss Nancy Paterson, the daughter of the Scotch minister in Funchal, who has an intimate knowledge of the language, the island and the people. With her assistance we were able to secure an excellent guide, and boat-crews to take us to the various islets. We found the people most friendly, and left them with regret. Owing to the magnificent bathing beach (something that Madeira lacks) there is now much talk of building a fashionable hotel for summer tourists. Very likely a few years will see a complete change in the character of the place, and though prosperity may come thereby, something will be lost, which we-- and Columbus-- loved in our time.

ADDITIONAL OCCURRENCES OF PLEISTOCENE PLANTS

By Edward W. Berry

A few additions to the Pleistocene flora of southeastern North America are contained in the following brief notes upon two small collections of fossil plants from Alabama and Tennessee.

Alabama

The following identifications are from material sent in by Dr. E. A. Smith, the State Geologist of Alabama. The plants occur in a 3½ foot peaty bed, underlain by white sand and overlain by about 16 feet of clay and sand, exposed in a cut on the Louisville and Nashville Railroad near Mountain Creek, Chilton County, Alabama. The lithologic character of the materials suggests a terrace deposit, and I regard the age as Pleistocene. The collection contains much coniferous wood, too decayed for generic determination, and the following named forms:

Pinus glabra Walt. Cones, cone axes and cone scales. This fossil occurrence is about the present northern limit of the Southern Spruce Pine, or slightly beyond, since it is rare north of the Central Prairie region of Alabama. In its wider range it is found from South Carolina to Louisiana.

Arundinaria sp., probably *macrosperma* Michx. Based on leaves. A common species of water courses and low damp woods.

Hicoria sp., probably *minima* (Marsh) Britton. Based on a nut. A wide ranging species in the existing flora, of no especial significance in the present connection.

TENNESSEE

This material comprises fruits or seeds coming from the loess of western Tennessee, which here has the appearance of being water lain. It was collected by Dr. Bruce Wace from the bottom of a 35 foot dug well, 5½ miles northwest of Covington, Tipton County, Tennessee. The identifications are by W. L. McAtee of the Biological Survey, and the species, so far as they can be determined, are all present in the existing flora of this region. So far as I recall the only plant fossil previously recorded from the loess is a nut of *Celtis mississippiensis* Bosc.[1]

Carex sp. Achenes of this form are very common in the loess, but the numerous existing species of Carex are difficult of discrimination from the fruits alone.

Persicaria sp. Identification certain as to genus, but the species are in general very difficult of separation from the character of the achenes. The many existing species are wide ranging.

Meibomia paniculata (Linné) Kuntze. This is a wide ranging dry soil species in the existing flora. The loess occurrence is based upon a single joint of a pod which is almost certainly this species.

Viburnum sp., probably *nudum* Linné. Based on a single stone. I have previously recorded the stones of this species from the late Pleistocene of North Carolina[2] and Florida[3]. *Viburnum molle* Michx. is associated with *nudum* at the former locality, and *V. dentatum* Linné at the latter.

[1] Berry, E. W. Torreya, 19: 10. 1919.
[2] Berry, E. W. ,Torreya, 14: 160. 1914.
[3] Berry, E. W. ,Jour. Geol. 25: 662. 1917.

PROCEEDINGS OF THE CLUB

Meeting of October 26, 1921.

The meeting of October 26, 1921, was held in the Museum of The New York Botanical Garden.

Mrs. Ruth H. Burritt, Yonkers, N. Y., and Miss Marie Matacotta, Elmhurst, N. Y., were elected to membership.

Dr. Arthur Hollick gave the "Notes on Introduced Plants of Staten Island" published in this number of Torreya.

Mrs. E. G. Britton spoke of "An African moss in Trinidad." She exhibited specimens of *Rhacopilopsis Pechuelii* (C. M.) Cardot from Africa and stated that no record exists of this genus as occurring anywhere except in Africa. Specimens of *Ectropothecium trinitense* (C. M.) Mitt. from Trinidad, collected by Cruger, on Mount Tocuche, were shown to belong to the genus *Rhacopilopsis.* Mrs. Britton stated that she had collected Mitten's *Ectropothecium trinitense* last winter at Morne Bleu, and had sent duplicates to Brotherus, who had confirmed her determination. Monsieur Thériot had been kind enough to send, in exchange, two specimens from French Guiana, which vary only slightly from the Trinidad species.

Dr. A. B. Stout spoke of "The Fringed Gentian at Pleasantville, New York." It appears that about fifteen years ago Dr. George F. Norton of Pleasantville, noting the absence or extreme scarcity of the fringed gentian in that locality, scattered seeds of it at several points, and that the plant is now moderately abundant in several places. A quantity of the minute seeds, recently collected, was exhibited and the form and peculiar appendages of the seed were shown under a microscope.

Under the title of "A rare *Polytrichum* in Oregon" Mr. R. S. Williams discussed *Polytrichum angustidens* H. Lindb. This species was first collected in Idaho by J. H. Sandberg in 1892, and it passed as *P. formosum* until H. Lindberg recognized its distinctive characters, the most important of which are found in the superficial cells of the lamellae of the leaf costa. Specimens obtained by J. C. Nelson, near Multnomah Falls, Oregon, constitute the second known collection of this species.

Dr. Marshall A. Howe remarked on "The Working of Long Lake, New York Botanical Garden." The murkiness of the waters of this pond during August and September appears to

have been due to the presence of numerous suspended filaments of a microscopic blue-green alga, *Oscillatoria prolifica* (Grev.) Gomont, previously known in America from Jamaica Pond near Boston and from Wisconsin. A more detailed account is published in the August number of the *Journal of the New York Botanical Garden.*

Dr. H. M. Denslow presented notes on some local orchids. In September, 1920, he collected in the adjacent towns of Bristol, Burlington, and Southington, in Hartford Co., Conn. More than 800 plants were counted, representing nine species of orchids. The most abundant was *Ibidium cernuum*, in pastures and along roadsides. *Ibidium gracile* was infrequent. A large colony of *Peramium pubescens* was found on a wooded hillside very near a popular resort in Southington and in one of the frequented parts of this grove a few plants were seen of each of the following species. *Galeopsis spectabilis, Corallorrhiza, odontorhiza, C. maculata*, and *Triphora trianthophora*. In the town of Burlington were found *Blephariglottis psycodes, Fissipes acaulis*, and *Peramium pubescens*. In a recent number of *Torreya*, Dr. G. Clyde Fisher reports *Cypripedium arietinum* from near Westport, N. Y. There are in the Garden herbarium specimens of this orchid from two other towns in Essex County, Chesterfield and Willsboro.

Marshall A. Howe
Secretary *pro tem.*

Meeting of November 8, 1921

The constitutional date for the first meeting in November falling on Election Day, a legal holiday, the meeting for this date was omitted.

Meeting of November 30, 1921

The meeting of this date was held in the Morphological Laboratory of The New York Botanical Garden.

The following persons were nominated for membership and afterwards elected:

Mr. John M. Arthur, Thompson Institute of Plant Research, Yonkers, N. Y.

Dr. A. H. Graves, Brooklyn Botanic Garden, Brooklyn, N. Y.

Miss Caroline G. Howe, East Orange, N. J.

Prof. W. D. Hoyt, Washington & Lee University, Lexington, Va.

Dr. Rudolph A. Konnerth, New York City.

Dr. L. O. Overholtz, Pennsylvania State College, State College, Pa.

Mr. Frank H. Rossiter, New York City.

Prof. T. G. Yuncker, De Pauw University, Greencastle, Ind.

The resignation of Mr. Arthur H. Thomas, Haverford, Pa., was read and accepted.

The first paper of the scientific program was a discussion of "Variation in *Pediastrum*" by Professor R. A. Harper. The speaker showed photomicrographs illustrating the range of variation in several species of *Pediastrum*. The form of the cell, though changing with age, is the most constant and dependable character in determining species. The number of cells in a colony is dependent on food and light conditions and colonies that look as if they belonged to different species or genera may be essentially the same when the characters of the individual cells are considered.

Dr. Marshall A. Howe, under the title of "Remarks on a Collection of Chinese Algae," reviewed previous contributions to the subject and reported upon a small collection of fifteen species made at Peitaiho by N. H. Cowdry in 1919. This collection includes what appears to be a new genus of red algae and besides extending the list of known Chinese algae is of interest on account of including several species that occur also on the Atlantic coast of the United States.

Dr. Arthur Hollick spoke of a "A New American Fossil Hepatic," showing the specimen, which came from Florissant, Colorado, and an enlarged photograph. The organism, evidently a bryophyte, was probably a member of the family Jungermaniaceae, the first member of this family to be reported from fossil remains in America. A new generic as well as a new specific name was suggested.

Dr. W. A. Murrill mentioned the fact that *Entoloma albidum*, a species originally described by him from Stockbridge, Mass., had been reported by Dr. H. D. House as the cause of violent illness when eaten by a family of five in Albany, N. Y., late in August, 1921. Specimens had been submitted to Dr. Murrill for identification. *Entoloma lividum*, of Europe, is dangerously

poisonous, and the American species of the genus are naturally under suspicion, though few of them have been actually tested.

MARSHALL A. HOWE
Secretary *pro tem*

MEETING OF DECEMBER 13, 1921

The scientific program of the evening consisted of an illustrated lecture on "Disease Resistance in Plants" by Professor L. R. Jones of the University of Wisconsin.

The speaker described studies on cabbage yellows caused by the soil parasite *Fusarium conglutinans*. A practical outcome has been the development through repeated selection of Fusarium-resistant strains of cabbages of several leading varieties, justifying the conclusion that resistant strains may be secured from any of the standard commercial varieties as may be necessary to meet regional needs. Of one of these, "Wisconsin All Seasons," some 5000 pounds of seed, sufficient to plant upwards of 25,000 acres, has been grown this year in a coöperative relation with the Bureau of Plant Industry and is being distributed by the National Kraut Packers' Association.

Similar results with other crop diseases illustrate the practical significance of disease resistance such as Orton's earlier work with cotton and cowpea, Bolley's wilt-resistant flax, Johnson's rootrot-resistant tobacco, and the recent results with disease-resistant tomatoes and beans. The fundamental problems forced upon the attention of phytopathologists concern the cause of such relative resistance or susceptibility and the influences of environment upon predisposition or disease development. Both aspects present complex problems, fundamentally physiological, and the results of the Wisconsin studies to date indicate an advantage in carrying them on in coördination. Chief attention thus far has been directed to examples of soil parasites. No single or simple explanation holds for disease resistance with these different types. In certain cases chemical contents may be the basis of resistance, in others the structure or composition of cell membranes. In either case environmental factors may influence the development of disease-resistant characters. Chief among these, as influencing metabolism, are temperature, moisture, light, and soil composition. Most attention has thus

far been directed to soil temperature as a factor with root parasites. It has been found, as would be expected, that modifications of soil temperature profoundly influence such disease developments.

Marshall A. Howe
Secretary *pro tem.*

NEWS ITEMS

Dr. N. L. Britton was one of those who recently appeared before the joint Congressional Committee at Washington to urge the establishment of a National Botanic Garden and Arboretum in Washington. The plan is to use a tract of some 800 acres, over half of which already belongs to the government, in the northeast section of Washington. The land varies from swamp along the Anacostia River to the forested summit of "Mount Hamilton." A description of the plans can be found in the January number of American Forestry.

The newspapers a short time ago reported that the government was making efforts to exterminate poppies from Flanders that had been discovered on ballast in New Jersey. *Papaver Rhoeas* has been known as a weed on ballast and waste places, both in the east and west, for many years. It is listed in the standard manuals and elsewhere and has never given any indications of becoming troublesome.

In the copy of the Literary Digest for November 19, 1921, there is an abstract of an article by Roland M. Harper published in the Engineering and Mining Journal on Relations between Vegetation and Mineral Deposits. Dr. Harper says "Mineral springs, petroleum, and natural gas are found mostly in the hardwood or prairie area, gold and copper in the area of coniferous forests. Coal and iron are somewhat intermediate, but the former tends more towards the hardwood area and the latter to the pine."

④ TORREYA

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SCORES OF STATIONS FOR GAYLUSSACIA BRACHYCERA IN WEST VIRGINIA.*

BY FRED W. GRAY

One evening about the middle of June 1921, while eating supper at the home of Dr. George W. Van Stavern in Dorr, W. Va., the conversation turned to good things to eat. He asked if I had ever eaten "Juniper" pie. I had to confess complete ignorance as to what he meant, but when he had described it as a blue berry more acid than the common "huckleberry" on pretty green bushes, I suspected that it might be the box huckleberry, *Gaylussacia brachycera.* The next day I went down the road below his house and sure enough there it was beside the "public road." I gathered a few specimens and sent one to Mr. E. T. Wherry of the U. S. Department of Agriculture.

In a few days I set to work by items in the local papers and by personal correspondence to try and determine the extent of the occurrence of *Gaylussacia brachycera* in this section. By August 8th about 75 different stations had been reported. This could never have been done without the common name "Juniper Berry." This is the only name I have been able to find for this plant, although other plants are also called "Junipers,"—e, g, *Vaccinium Pennsylvanicum* is called "Sweet Juniper" because the berries are sweeter and ripen about the same time as *G. brachycera.*

On August 8th Mr. Wherry arrived and we went over the territory together for five days. In all, at that time and before and since, I have visited about forty stations in three counties, Greenbrier, Monroe and Summers. I have reports of occurrences in Raleigh and Pocohontas Counties in West Virginia and in some of the bordering counties in Virginia.

*In the May, June 1921 issue of Torreya (Vol. 21, page 53) is recorded a reference to the three known stations for the box huckleberry.

The territory in which it is found seems to correspond, at least in a general outline, to the mineral spring section of the Alleghanies. It is to be remembered that Michaux discovered it at "Warm Springs," Kin at "Kriem Prier," or something like that, meaning Greenbrier, four miles from White Sulphur Springs, and Pursh at Sweet Springs. I myself found it between the last two within 50 yards of an iron and alum spring. Many of the other stations are near mineral springs. Whether this has any real significance or not remains to be determined.

The patches occur most frequently along bluffs and near them on top. One reason for this is that in this section most of the sour or acid soil is found in such places, most of the land back from the bluffs along the streams and some on ridges and mountains is limestone. The patches most of them occur on northern or western exposures, I know of only three on southern exposures. This does not mean that it does not like sunshine, for Professor Sargent of the Arnold Arboretum says that it grows equally well in the sun, and I have seen just as thrifty plants growing at the edges of woods as in the shade. I think that the explanation is that the most favorable conditions for its seeding itself are found on northern and western exposures. All the seedlings that I have found were on such exposures, on shaded roadside banks, with either leaf mold or moss or the two mixed, and most plentifully where the banks were quite moist. The fact that seedlings are of slow growth makes it probable that in a southern exposure the soil would become so dry as to cause them to perish. I have seen seedlings five years old that had stems not over one fourth as large as an adult stem. Flat shady woods seem fairly well suited to self seeding as in one place on a flat topped ridge we found a number of distinct patches of different sizes. One patch bore albino berries the others the usual blue, this albino patch had very distinct outlines. Just over the hill from this is another albino patch that merges with other patches. There is also considerable variation between different patches in leaf size and shape. Some patches do not bear, or at least very little, and are called by the negroes "he junipers." We have not yet seen the plant with the enormous crops that they are said to bear, so do not know how much variation there may be in shape, size and color of the berries. Another season will add much to our knowledge of this interesting plant.

A PHAENOLOGICAL STUDY IN NEW ENGLAND

BY C. J. LYON

After reading a paper by Francis Darwin[1] in which he seemed to draw the general conclusion that the first flowering of plants in England did not correlate with the temperature factor, the writer undertook to determine the facts for this locality. He was fortunate in having access to complete records of reported first flowerings and to Weather Bureau records of temperatures. Even a cursory examination convinced him that the correlation was positive and generally striking.

At the Howe Library, in the village of Hanover, N. H., is kept a record and exhibit of the results of the competitive search for the early flowers. The writer attests to the real competition that exists and into which both young and old enter, so that it is fairly certain that the first blossoms are reported promptly, certainly more promptly than could be accomplished by any one person. The librarian, Miss Etta M. Clark, and her assistants have done the work of identification for years[2] and have used standard keys including Gray's Manual. The competitive interest serves as a check on the accuracy of the identification and the writer, in following the records for the spring and early summer of 1921, detected only a few minor inaccuracies. Miss Clark is to be given the credit for this part of the study and the writer takes this occasion to acknowledge her contribution to this paper.

In selecting species for the accompanying table, care has been used not to include: (1) those that did not appear in the records for at least three years out of the five; (2) those that could be easily confused, e. g. *Uvularia* and *Oakesia*, and certain violets; (3) those found only through July and August when the interest naturally lags and when certain collectors (including members of the faculty of Dartmouth College) have left the locality; and (4) specimens that were not collected in the immediate vicinity of Hanover.

The following table of temperature conditions for the years 1917–1921 inclusive, was drawn from the record books of the

[1] Darwin F. A Phaenological Study. New. Phyt. 18:287-298. 1919.

[2] The work was begun in 1914 but the records for the first three years are incomplete.

Weather Bureau's cooperating station at Dartmouth College. In each case the mean was obtained by averaging the maximum and minimum temperatures. The normal daily mean was obtained from the complete records of the years 1910–1920 inclusive.

Week or Month	Normal Daily Mean Temp	Deviation from normal daily mean temperature				
		1917	1918	1919	1920	1921
January	17.3	+ .6	—9.35	+ .55	—4.	+ 3.65
February	18.7	—3.2	—3.5	+3.5	— .5	+ 4.85
March	30.1	— .4	— .9	+3.9	+ .9	+ 8.55
April 1–7	37.9	+ .7	+4.7	—1.6	—2.3	+11.
April 8–14	39.4	—6.7	+ .2	+7.7	—4.8	+ 5.9
April 15–21	42.9	+ .3	—1.4	+1.3	+ .7	+ 6.4
April 22–28	47.7	—4.1	—1.7	—4.3	—4.4	+ 5.2
April 29–May 5	49.7	—8.4	+2.9	+2.	—6.1	+ 4.1
May 6–12	53.2	—8.4	+7.2	—4.5	—5.1	— 2.8
May 13–19	54.6	—6.2	+8.3	— .8	—3.4	
May 20–26	57.9	—7.7	+5.1	+2.6	—1.	+ 2.8
May 27–June 2	58.9	—4.8	+6.6	+3.4	+6.4	+ 4.
June 3–9	60.5	+2.3	+ .5	+9.7	—2.1	— .8
June 10–16	62.0	+ .4	—3.8	+4.4	+2.9	+ .4
June 17–23	63.2	+2.2	—9.6	+3.4	—4.5	+ 2.4
June 24–30	65.8	—3.2	—3.	—2.4	+ .9	+ 4.
July 1–7	68.6	—2.9	—3.7	+4.6	—5.	+ 5.3

The chronological chart of the 104 species recorded is arranged in the order of the earliest dates recorded for the species for the years 1917–1921 inclusive. Practically it means that the order is that in which they appeared in the year 1921, which gave the earliest dates for all forms except those that appear with a star after the date following the name of the species. In a few of these cases it will be observed that no record appeared for the given flower in 1921.

The following interpretations as to the correlations with temperatures seem to be plainly indicated.

1917. In general the flowers were late in making their appearance and in the majority of cases were last of the five seasons (out of 91 recorded for 1917, 66 were last). Up through No. 17 there seems to be a tendency for the season to be a little

ahead of others, notably 1920. A glance at the temperature chart will show that there exists a strong correlation between the negative deviations and the late flowering. The season of 1917 is marked by a preponderance of negative deviations of comparatively large magnitude. The few positive deviations almost coincide with the periods of flowering in which the season was not completely behind all other seasons. Certainly the cool temperature seems to have been responsible for the late flowering.

1918 and *1919*—These two years can well be discussed together since on the chart their curves alternate for the second place to the earliest. Up through No. 22, 1919 (o) leads 1918 (‡) with a very few exceptions. At that point the flowering in April has passed. A study of the temperature deviations shows that the greater number of positives are on the side of 1919, especially during the months preceding flowering.

And with the coming of large positive deviations in the 1918 column for the month of May, if the temperature control is strong, the ‡ curve should lead the o curve through that month. With but four exceptions (nos. 27, 29, 30 and 40) it does lead through No. 72 where the flowering passes over into June, and indeed well on through the season with a few exceptions toward the end.

This last fact is true in spite of the winning of the temperature balance by 1919 from June 1st on. Either this is evidence against the importance of the temperature control, or, what seems more probable in the face of the other evidence, the start given through May to the 1918 plants was sufficient to keep most species well ahead for the rest of the season, when it had ceased to be a question of getting minimum warmth to grow and flower.

So the study of these two seasons seems to give evidence in favor of temperature control, particularly by that of the pre-flowering months, possibly by optimum conditions in mid-season that even carry over another month.

1920—This season (recorded by a †) is of little interest except as it partially confirms the results of 1917. With temperatures generally below normal from January on, it is not surprising to find that the curve generally falls behind all but 1917 (the coldest season), though there are glaring exceptions to that condition. The general lateness of the dates makes the writer feel that there is a distinct positive correlation.

1921—The correlation of temperature and flowering is obvious for this season. Sometimes the gap between the 1921 date and the nearest one to it is as great as three weeks as in the case of No. 21. This flower is not uncommon here and the discrepancy can not be attributed to chance.

Even in the case of a few species that flowered earlier in another year, in some cases at least that fact is correlated with a lowering of 1921 temperature. Nos. 55, 58, 59, 60, 67–72 can all be explained either by the absence of a 1921 record or by the fall of 1921 temperature to normal or below for the period May 6–19.

§ 1917 ‡ 1918 o 1919 † 1920 * 1921

Species	Earliest Date Mo. Day	MARCH 7	MARCH 14	MARCH 21	MARCH 28	APRIL 7	APRIL 14	APRIL 21	APRIL 28	MAY 7	MAY 14	MAY 21	MAY 28
1. Hepatica triloba	3–25				*	o†	§‡						
2. Tussilago Farfara	3–26				*		o	†	‡				
3. Epigaea repens	3–28				*	o	‡	†	§				
4. Houstonia caerulea	3–28				*			† o	‡	§			
5. Taraxacum officinale	4– 1					* ‡ o	§ †						
6. Sanguinaria canadensis	4–10					* o		‡ §	†				
7. Viola rotundifolia	4–10					*o		§	† ‡				
8. Saxifraga virginiensis	4–10					*		o †	‡	§			
9. Claytonia virginica	4–10					*		o §	† ‡				
10. Asarum canadense	4–10					*		o	§†	‡			
11. Antennaria sp?	4–10					*		o		†			
12. Dicentra cucullaria	4–10					*		§	‡ †	o			
13. Fragaria virginiana	4–10					*			†o	§			
14. Caulophyllum thalictroides	4–10					*			§	‡ o †			
15. Erythronium americanum	4–12						*	o §	† ‡				
16. Dirca palustris	4–12						*		o †				
17. Dentaria diphylla	4–12						*			‡ o §	†		
18. Capsella Bursa-pastoris	4–13						*		o‡		†		
19. Nepeta Hederacea	4–14						*		o ‡	†		§	
20 Ranunculus abortivus	4–18							*	†	o §			

§ 1917 ‡ 1918 o 1919 † 1920 * 1921

Species	Earliest Date Mo. Day	APRIL 7	APRIL 14	APRIL 21	APRIL 28	MAY 7	MAY 14	MAY 21	MAY 28	JUNE 7	JUNE 14	JUNE 21	JUNE 28
21. Viola rostrata	4-18			*			o ‡	†		§			
22. Anemone quinquefolia	4-19			*			o†	§ ‡					
23. Caltha palustris	4-21			*		‡	o	† §					
24. Viola blanda	4-22			*		‡† o §							
25. Trillium erectum	4-25				*‡	†							
26. Arisaema triphyllum	4-25				*	‡ o §	†						
27. Amelanchier canadensis	4-25				*	o ‡	†	§					
28. Aquilegia canadensis	4-25				*	‡ §	†o						
29. Mitella diphylla	4-25				*	o	† ‡§						
30. Viburnum alnifolium	4-25				*		o‡		§				
31. Dicentra canadensis	4-26				* †	o ‡		§					
32. Viola pubescens	4-26				*	‡	†o§						
33. Waldsteinia fragaroides	4-26				*		† ‡	§	o				
34. Vaccinium pennsylvanicum	4-30				*		‡	†o	§				
35. Tiarella cordifolia	5- 2					* ‡	o	† §					
36. Polygala paucifolia	5- 2					* ‡	o	† §					
37. Coptis trifolia	5- 2					* ‡	o	†	§				
38. Zizia aurea	5- 2					*	† o			§			
39. Brassica nigra	5- 2					*	‡ o	†					
40. Saxifraga pennsylvanica	5- 2					*		o †	‡§				
41. Trillium undulatum	5- 4					*	‡† o						
42. Panax trifolium	5- 6					* ‡		† §					

§ 1917 ‡ 1918 o 1919 † 1920 * 1921

Species	Earliest Date Mo. Day	APRIL 7	APRIL 14	APRIL 21	APRIL 28	MAY 7	MAY 14	MAY 21	MAY 28	JUNE 7	JUNE 14	JUNE 21	JUNE 28
43. Maianthemum canadense	5– 6*					‡	* §		o†				
44. Pedicularis canadensis	5– 7					*		†	o	§			
45. Corallorrhiza trifida	5– 7					*			o †	§			
46. Trientalis americana	5– 8					*	‡		o †§				
47. Clintonia borealis	5– 8					*		‡	o †	§			
48. Euphorbia Cyparissias	5– 8					*		‡o	†	§			
49. Aralia nudicaulis	5– 8					*		‡ o	†	§			
50. Smilacina stellata	5– 8					*		‡ †		o		§	
51. Streptopus roseus	5– 8					*		†	o	§			
52. Rhodora canadense	5– 8					*			†	o ‡	§		
53. Cypripedium parviflorum	5–10						*	‡		o† §			
54. Orchis spectabilis	5–10						*	‡	o §				
55. Polygonatum commutatum	5–11*						‡ *	†					
56. Corydalis sempervivens	5–11						*	‡	†	o		§	
57. Erigeron pulchellus	5–12						*	‡	†o	§			
58. Viola canadensis	5–14*						‡§	†	o				
59. Cornus canadensis	5–15*						‡	*	†	o		§	
60. Ranunculus septentrionalis	5–16*						‡*	o †	§				
61. Potentilla canadensis	5–16						*‡		o	§			
62. Geum rivale	5–16						*	o †				§	
63. Ranunculus acris	5–16						*	‡	o †				
64. Chelidonium majus	5–16						*	† ‡ o		§			

§ 1917 ‡ 1918 o 1919 † 1920 * 1921

Species	Earliest Date Mo. Day	MAY 7	MAY 14	MAY 21	MAY 28	JUNE 7	JUNE 14	JUNE 21	JUNE 28	JULY 7	JULY 14	JULY 21	JULY 28
65. Sisyrinchium augustifolium	5-16			*	† ‡	o	§						
66. Habenaria Hookeri	5-16			*	‡	† o		§					
67. Erigeron ramosus	5-20*			‡			†						
68. Erigeron annuus	5-20*			‡ *	o	§	†						
69. Trifolium pratense	5-22*			‡*		o †	§						
70. Carum Carvi	5-23*			‡*		† o		§					
71. Smilacina racemosa	5-23*			‡	o	† §							
72. Cypripedium acaule	5-23*			‡	o	† §							
73. Sarracenia purpurea	5-23			*		†o			§				
74. Arethusa bulbosa	5-23			*		‡†		§ o					
75. Geranium Robertianum	5-24			* o		‡ †							
76. Lychnis alba	5-24			* o		‡	†	§ o					
77. Linnaea borealis var. americana	5-24			*		o †	‡	§					
78. Medeola virginiana	5-26				* ‡	o†		§					
79. Oenothera pumila	5-26				*	‡ o	†		§				
80. Nymphaea advena	5-27				*		†‡						
81. Trifolium agrarium	5-28*				o	‡ *	† §						
82. Chrysanthemum Leucanthemum	5-29*				‡	o†		§					
83. Hieracium aurantiacum	5-29*				‡	*	o	§†					
84. Trifolium hybridum	5-29*				‡	o *		§					
85. Achillea Millefolium	5-30*				‡	* o	†	§					
86. Iris versicolor	5-30				*	‡ o†		§					
87. Vaccinium Opulus var. americanum	5-30				*	o ‡	†		§				

§ 1917 ‡ 1918 o 1919 † 1920 * 1921

Species	Earliest Date Mo. Day	MAY 7	MAY 14	MAY 21	MAY 28	JUNE 7	JUNE 14	JUNE 21	JUNE 28	JULY 7	JULY 14	JULY 21	JULY 28
88. Thalictrum polygamum	5–30				*	‡ †	o		§				
89. Vicia americana	6– 3*					‡ o	*		§				
90. Prunella vulgaris	6– 4*					‡ *	o	† §					
91. Stellaria longifolia	6–6					* ‡ o			§				
92. Solanum nigrum	6–6					* ‡	o		§†				
93. Anemone cylindrica	6–10						* ‡ †	§					
94. Pentstemon hirsutus	6–10						*‡	o	†	§			
95. Apocynum androsaemifolium	6–13						* ‡	o	†	§			
96. Rudbeckia hirta	6–13						* ‡ o		†	§			
97. Cypripedium hirsutum	6–13						*	o	§	‡ †			
98. Veronica americana	6–16*						o	*	§†				
99. Pyrola elliptica	6–16*						‡	o	*	§ †			
100. Asclepias syriaca	6–20							* ‡	o	§			
101. Mimulus ringens	6–20*							‡	*		o §		†
102. Spiraea salicifolia	6–23*							†*	o	‡	§		
103. Verbena hastata	6–24*								‡ *	o		§	
104. Hypericum perforatum	6–27								* o	‡ †	§		

Star by date indicates some other year than 1921.

In general the whole chart shows a wide range of variation for most of the species. Perhaps this is not unexpected for this rather severe climate but when the correlation between the recorded mean temperatures and the first flowering is as plainly shown as by the seasons 1917 and 1921, if not by others, it seems probable that temperature is the chief controlling factor.

Department of Biology
Dartmouth College.

A CASE OF PISTILLODY AND STAMINODY IN THE PLUM.

BY HAROLD B. TUKEY

This past season in a variety of cultivated plum, probably (*Prunus triflora*) x (*P. triflora* x *Simonii*), a queer case of pistillody of the stamens and staminody of the petals occurred. These are not unusual phenomena but, as they are most often reported, one whorl of floral parts is entirely and uniformly replaced by another. In this case, however, there was more or less of a gradation from one member to another within the different whorls.

Normally the flowers of the plum (*Prunus spp.*) are arranged after this fashion: A single pistil, bearing one style and one stigma, at the bottom of a cup-shape receptacle on the edge of which are five sepals, five petals, and fifteen to many stamens-the petals alternate with the sepals. Fifty per cent of the flowers on the trees of this variety were so arranged, but the other fifty per cent presented a host of variability.

Frequently the stamens were replaced by pistils and when this was the case the pistils were either five in number and alternate with the petals or ten in number in five groups of two, likewise alternate with the petals. On the inner side of each of these pistils from the stigma to the base of the ovary ran a distinct suture, so that their appearance was that of what might be characterized as "introrse pistils," a name which is seen to be more appropriate when it is said that normally the pistils dehisced along this line and aborted the ovule contained within the ovary.

One whorl of replaced stamens consisted of four pistils of the nature just described and, in place of the fifth, a filament-like object of about the same length as the other pistils and terminated by a stigma. Probably this was a pistil devoid of an ovary, yet its appearance was that of a stamen whose anther had been replaced by a stigma. Another instance very similar to the last consisted of a whorl of four pistils and one stamen in place of the whorl of stamens; and again in an arrangement, likewise alternate with the petals, of eight pistils in four groups of two, and a pistil and stamen-like pistil, as described above, together in the fifth group.

The petals when replaced by stamens exhibited similar gradations. In one flower instead of the normal five petals were found (1) three petals, (2) a filament-like member terminated by a small petal-like appendage, and (3) a filament-like member terminated by a similar petal-like part but with two swellings that suggested the formation of an anther. Another flower exhibited for its whorl of petals three petals, one filament-like petal, and one stamen. Finally, in still another were combined several of these instances. For the whorl of petals were three petals, a filament-like petal, and a stamen; for the whorl of stamens were four pistils and one stamen. In no cases were the sepals or the main pistil variable.

The setting of the fruit was normal and the abnormal pistils were lost when the calyx, from which they arose, was pushed off by the developing main ovary. There were two trees of the variety under observation and both exhibited the same phenomena. Whether this peculiarity is a varietal characteristic or the result of a frost which occurred about the time of blossoming is not known.

N. Y. Agricultural Experiment Station.
Geneva, New York.

SHORTER NOTES

Changes in Phanerogamic Names

By J. C. Arthur

In studying and listing the rusts of the western hemisphere, and bringing the names of the hosts under a uniform nomenclature, the following new combinations have arisen, which it is desirable to establish.

Bivonea urens (L.) comb. nov. (*Jatropha urens* L. Sp. Pl. 1007. 1753 *Cnidoscolus urens* Arth. Torreya **21**: 11. 1921). A common plant of tropical America bearing *Uromyces oaxacanus* Diet. & Holw.

Chamaesyce cordata (Meyen) comb. nov. (*Euphorbia cordata* Meyen, Reise um die Erde 150. 1843).

Chomaesyce clusiaefolia (Hook. & Arn.) comb. nov. (*Euphorbia clusiaefolia* Hook. & Arn., Bot. Beechey's Voyage 95. 1841).

Chamaesyce Hookeri (Steud.) comb. nov. (*Euphorbia Hookeri* Steud., Nomencl. Bot. ed. 2, **1**: 612. 1840). The three preceding species occur in Hawaii, and bear rusts native to the islands.

Coleosanthus adenocarpus (B. L. Robinson) comb. nov. (*Brickellia adenocarpa* B. L. Robinson, Mem. Gray Herb. **1**: 93. 1917). This species bears *Pucciniosira Brickelliae* Diet. & Holw., in Guatemala.

Dasystephana Newberryi (A Gray) comb. nov. (*Gentiana Newberryi* A. Gray, Proc. Am Acad. **11**: 84. 1876). Native of central California: bears *Puccinia Gentianae* (Str.) Link.

Tithymalus leptocerus (Engelm.) comb. nov. (*Euphorbia leptocera* Engelm.; Torrey in Pacific Railroad Rep. **4**: 135. 1857). Mountains of California and adjacent states; bears *Melampsora monticola* Mains, a native rust not known until recently, but now abundantly collected.

Purdue University,
Lafayette, Indiana.

Advertising for a tree

The following poster is being distributed throughout Long Island. Comment on it is unnecessary.

What is the Biggest Tree on Long Island?

A Competition open to all

An effort is being made to find out what are the biggest trees on Long Island by Norman Taylor of the Brooklyn Botanic Garden, who is writing a book on the "Vegetation of Long Island." Residents of the Island, nature trampers and others are invited to send in records of the biggest trees they can measure. The winner of the competition will receive fifteen dollars, the second largest record ten dollars, and the third five dollars. The competitors are urged to observe the following suggestions:

1. The trees must be native and living. Foreign planted trees such as Weeping Willow, and others not eligible.
2. Circumference taken five feet from the ground, around a single trunk, not around a collection of them from a single root as sometimes happens.
3. Name (if possible) and exact location of tree and date of measurement.
4. If two or more contestants report on identical trees the first report received to be counted.
5. Contest closes on August 31, 1922.

Competitors may send in as many records of trees as they please. The undersigned will verify the measurements of the four biggest trees. Address all replies to Norman Taylor, Brooklyn Botanic Garden, Brooklyn, New York. Winner and results of the competition will be announced in the newspapers.

PROCEEDINGS OF THE CLUB

Meeting of January 10, 1922

The meeting was the annual business meeting, held at the American Museum of Natural History.

The minutes of the meetings of November 30 and December 13 were read and approved.

Professors C. R. Orton of State College, Pa., and Alfred H. W. Povah of Auburn, Ala., were elected to membership. The resignation of Mr. John W. Ritchie of Yonkers, N. Y., was accepted.

Reports of the officers were presented, accepted, and ordered to be placed on file.

The Acting Secretary reported the election of 39 members. during 1921 and the loss of 13 members by resignation or death.

Dr. Britton for the Local Flora Committee reported the results of a movement to stimulate the writing of notes and papers on the local flora for publication in Torreya in 1922; also the removal of the local flora herbarium to larger and more convenient quarters in the Museum of the N. Y. Botanical Garden; the gift of Mr. Kenneth Kent Mackenzie of a large and handsome oak table for use by those consulting this herbarium; also the appointment of the Rev. Dr. H. M. Denslow by the Managers of the N. Y. Botancial Garden as the honorary Custodian of the local flora herbarium. Dr. Britton stated that Mr. Mackenzie had proposed to give fifty dollars to be used towards defraying expenses of guides for the field meetings and, feeling that this might have a beneficial effect upon the field excursions of the Club, Dr. Britton said that he would add his personal check for the same amount, with the understanding that specimens of interest obtained on these excursions should be added to the local flora herbarium.

Officers for the ensuing year were then elected, the list of officers appears on the inside front cover of Torreya.

Adjournment followed.

Marshall A. Howe
Secretary

January 25, 1922

The meeting of January 25, 1922, was held in the Morphological Laboratory of the N. Y. Botanical Garden.

Prof. John T. Buchholz, University of Arkansas, Fayetteville, Ark., and Mr. Warren Travell, New York City, were elected to membership.

The resignation of Dr. Loren C. Petry was accepted.

Dr. F. J. Seaver discussed "The White Pine Blister Rust," directing special attention to some handsome colored photographs sent to the Museum of the New York Botanical Garden by the Bureau of Plant Industry. These illustrated the aecial stage of the rust on the white pine, other stages on species of *Ribes*, and methods of control through the eradication of *Ribes*.

The history of the introduction of the disease into the United States was sketched by Dr. A. H. Graves. Professor Harper alluded to investigations by Pennington which suggest the possibility of ultimate control through the killing of *Ribes* by the fungus itself.

Dr. Arthur Hollick, under the title of "Notes on Winter Buds of Paulownia" exhibited and discussed the flower-buds of *Paulownia tomentosa*, which are conspicuous objects through the winter, even though not opening until late spring or early summer. The open panicle with its widely separated buds, in striking contrast with the condensed miniature panicle in the winter flower-buds of such shrubs as *Syringa*, may possibly be interpreted as suggesting tropical affinities and antecedents. The genus *Paulownia* is commonly regarded as monotypic, but there may be two or more species in China. Only one fossil, consisting of leaves only, has been referred to the genus and that is from the late Tertiary in France.

Under the title "Notes on Fungi," Dr. W. A. Murrill exhibited a new species of *Lepiota*, collected by Zeller at Corvallis, Oregon. He remarked especially upon the beauty of its coloring. He spoke also of the occurrence of *Hygrophorus caprinus* in the vicinity of Boston, as proved by collections sent in by Miss Blackford and the exceptional occurrence of *Trametes suaveolens*, a species usually found on willow, on the large-toothed aspen at Yama Farms in the Catskills.

Mr. Kenneth R. Boynton spoke of "*Sinningia speciosa* and the Gardeners' Gloxinia." It appears that the plants popularly cultivated under the name "Gloxinia" are supposed to have been derived from the *Sinningia speciosa* of Brazil and that they are quite different from the rarely cultivated plants now known to botanists under the generic name *Gloxinia*. An herbarium specimen of *Sinningia speciosa* and cultivated flowering specimens of "Gloxinia" of the gardeners were exhibited.

MASHALL A. HOWE
Secretary

MEETING OF FEBRUARY 14, 1922.

The meeting of this date was held at the American Museum of Natural History.

The announced lecture on "Botanizing in British Guiana"

by Dr. H. A. Gleason was postponed on account of the illness of Dr. Gleason. Dr. G. Clyde Fisher gave a most interesting illustrated talk on "John Burroughs and his Favorite Haunts." Many of the lantern-slides were concerned with plants of the Hudson River valley and the Catskill Mountains.

MARSHALL A. HOWE
Secretary

MEETING OF FEBRUARY 22, 1922.

As the fourth Wednesday in February coincided with a legal holiday, the second meeting for the month of February was omitted.

MARSHALL A. HOWE
Secretary

NEWS ITEMS

Dr. and Mrs. N. L. Britton returned to New York on April 10, having devoted several months to botanical explorations in Porto Rico.

Dr. Francis W. Pennell, who was Secretary and Treasurer of the Torrey Botanical Club during the greater parts of 1920 and 1921, is now Curator of Botany in the Academy of Natural Sciences of Philadelphia. His former position as Associate Curator at the New York Botanical Garden has been taken by Mr. James A. Crawford, formerly of the Buffalo Botanic Garden. Dr. Pennell recently left with his wife to spend some months collecting in Columbia, S. C.

An obituary notice of the late George Valentine Nash, who was for twenty years Head Gardener of the New York Botanical Garden and for even a longer period a member of the Torrey Botanical Club, appears in the *Journal of the New York Botanical Garden* for last August.

Through the personal generosity of Dr. N. L. Britton, the New York Botanical Garden has acquired the collection of algae left by Mr. F. S. Collins of Malden, and later of North Eastham, Mass. This collection includes more than 40,000 specimens and is doubtless one of the largest private collections of its kind in existence. The late Mr. Collins was the author of a well-known monograph on "The Green Algae of North America and of other important papers on the algae of the United State Bermuda, Jamaica, etc.

The Thompson Institute for Plant Research.

The Thompson Institute for Plant Research was founded by Colonel William Boyce Thompson of Yonkers, New York. It is being built at 1086 North Broadway, Yonkers.

The Institute is to devote itself to fundamental research on plants. In the beginning the greater emphasis will be placed on the physiological, pathological and biochemical phases of the subject, for it is felt that these phases of the subject most need additional attention. In pathology especial attention will be given to the physiological and chemical aspects, involving a study of the effect of nutritional, growth and hereditary factors upon development of fungal, bacterial and viris diseases.

While the main emphasis is to be placed on the phases of the subject mentioned above, the staff will be so chosen as to bring together the knowledge and technic of all phases of the subject of plant science. It is hoped to focus this diversity of knowledge and technic upon the solution of problems of plant development and disease. It is believed that, because of the complexity of biological problems, such cooperative attacks are now necessary for anthing like a speedy and thorough solution of them. The same is true of many problems in medicine and the industries but in these such cooperative attacks are more common.

Besides the most modernly equipped laboratories and greenhouses for plant research. there will also be a number of greenhouses and other chambers in which all growth factors are under control: light (duration, quality and intensity), carbon dioxide concentration, temperature of soil and air, water vapor of air, and soil nutrients. In this way all factors can be accurately studied in their relation to development and disease. Control of these factors over a wide range of intensity will make it possible to study plants of very different nutrient constitution in both health and disease.

One Hundred Years Ago. "The present rage for cutting up genera has gained such an ascendancy, that I am compelled to yield to it, though with pain and regret. Every artificial character is seized with greediness and applied with great ingenuity in mangling the Linnean system of genera. I consider it the ephemeral reign of Innovators, which our successors will remember but to despise. And most of these new names which

are founded on artifical characters will soon sleep with their authors."—Eaton's Manual of Botany (3rd ed.) 414. 1822.

The cut of Dr. Torrey appearing on our cover is made from a photograph of the excellent bust of Torrey at the American Museum of Natural History. The Club is grateful to the museum for furnishing the photograph and for permission to use the cut.

TORREYA

Vol. 22 No. 3

May and June, 1922

SOME AMATEUR OBSERVATIONS ON COLOR-FORMS

By C. A. Weatherby

When the botanizer whose activities are, like those of most of us, confined to a comparatively limited area begins to feel the pressure of the law of diminishing returns—when it becomes harder and harder to find unfamiliar species or even new stations for rare ones and he looks about for some new world to conquer—then the study of the variations of color in flowers of the same species offers a field of observation in which little has been done. That this is the case is doubtless because color-forms have to be studied in fresh material and, since they are comparatively rare, it is hard for any one investigator to get hold of any very large number of them in the proper condition. But if many amateurs, each in his own locality, would even list and, so far as possible, classify those which come under their eyes, the combined lists could hardly fail to add considerably to our knowledge in this direction. It is with the hope of starting some such composite list that I have ventured to set down the results of my own scattered observations.

By color-forms I do not mean the slight variations in shade, often due to differences in intensity of light, which occur in all colored flowers, but marked and striking changes in shade or hue—marked, at least, in their extremes, for they may be connected by intermediates with the typical forms. The searcher after such variants will presently notice that they tend to fall into groups—that flowers of a certain color will vary in one direction and not in another. So far as my experience goes, I can distinguish five lines of color variation, enumerated below. Under each I have listed such examples of it as I have actually seen.

1. Any flower of strong color is likely to develope paler variants. These are doubtless due to a weakening of the pigment; they do not, however, appear to be due to weak illumination, for they occur side by side with the usual, strongly colored forms. They give no real change of hue from the latter, but are often of strikingly different appearance. Such forms are *Aquilegia canadensis* with the usually red parts of the flower a delicate salmon-pink; pink *Lobelia cardinalis;* pale blue *Campanula rotundifolia;* and pale yellow or cream-colored forms of such usually orang or bright yellow blossoms as *Impatiens biflora, I. pallida, Gratiola aurea, Lysimachia terrestris, Hypericum punctatum,* and *Potentilla pumila.*

2. Albinos—the commonest and best-known kind of color-forms. Here, however, Dr. Gray's *nota bene*, that white forms of all colored flowers are to be expected, seems to need emendation. Such forms, pure white and destitute of any trace of color, are to be expected in all blue, purple, magenta, and pink and in some crimson, flowers. I have seen them, to cite a few cases, in *Campanula rotundifolia, Hepatica americana, Sisyrinchium atlanticum, Lobelia spicata, Habenaria fimbriata, Geranium maculatum, Monarda mollis, Epilobium angustifolium, Rubus odoratus, Agalinis purpurea, Teucrium canadense,* and *Sabatia stellaris.* But I have never seen a really white form of any scarlet, orange, or yellow flower. Such a form has been credibly reported in *Gratiola aurea* and there are at least two records of white forms of *Impatiens biflora.* One of these I ran down and was informed by its author that though he had heard of white flowers in the species, all he had actually seen were cream-colored. It seems safe to assume that albinism is, at the very least, much rarer in flowers of the yellow than in those of the blue-pink series. The same tendency seems to exist, or better, persist, in cultivated plants. Take up any seedsman's catalogue and you will find that in practically all flowers which were originally blue, purple or pink, white forms are advertised; but you will see no mention of white coreopsis or marigolds or sunflowers. When, as in the case of the California poppy, wall-flower, and nasturtium, pale forms occur, they are described as "whitish" or "creamy white," not "pure white" or "paper white," as in the other series. And this would seem to parallel quite exactly what takes place in the wild.

3. The reverse of albinism—cases in which normally white or greenish flowers develop color. This variation occurs in two directions. Normally white or greenish flowers may become more or less flushed with pink, as in *Dicentra Cucullaria*, *Anemone quinquefolia*, *Rubus alleghaniensis*, *Circaea latifolia* and *Daucus Carota*, or even deep red, as I have seen them in *Vaccinium vacillans*, or purple, as in *Daucus Carota*. Or normally white flowers may develop a cream-colored pigmentation. I have seen but one case of this, in *Habenaria blephariglottis*. Similar forms of this species have been regarded as hybrids with *H. ciliaris;* but my specimens were found at South Windsor, Conn., where the latter is wholly unknown.

4. Blue or purple to pink, as in *Trichostema dichotomum*, *Aster novae-angliae*, *Lupinus perennis*, *Hepatica americana*, *Linaria canadensis*, and *Prunella vulgaris*. The reverse change, from pink to blue, does not seem to take place in our region and perhaps not in nature—the impossibility of a blue rose or a blue orchid is proverbial. In certain *Boraginaceae*, however, as is well known, the bud is pink and the mature corolla blue in the same flower, and in *Desmodium marilandicum* and related species the magenta flowers take on when withering a peculiar greenish blue.

5. Crimson or scarlet to yellow or vice-versa. *Lilium philadelphicum*, *L. canadense*, *Castilleja coccinea*, *Trillium erectum*, *Corallorrhiza maculata* and the red or yellow portions of the flower in *Aquilegia canadensis* and *Pedicularis canadensis* are examples. This change takes place in both directions: *Lilium philadelphicum* has a beautiful clear yellow form and *L. canadense* a red one rather common in some localities.

If one carries curiosity further and asks what causes color-forms and by what process they arise, his quest for a satisfactory answer is likely to be long. One thing seems wholly probable, almost certain—that they are not produced by external conditions. They occur ordinarily in the closest association with the typical forms of their species. I once thought indeed, that I had detected a difference in the specific acidity of the soils in which certain color variants and the typical forms near by grew, but the difference held only for the first three or four cases tested: in the next three or four it broke down. Whatever the cause may be, it is apparently something internal and physiological,

perhaps merely functional, resulting in chemical action which either stops the production of the usual pigment partially or altogether, or changes its color.

What the chemical action is, must be left to the experts to discover. The amateur can, however, make, after a fashion, solutions of flower-pigments, try their reactions to acid and alkali and thereby gain some rough idea of the kinds of pigment concerned in the different changes. These tests are pretty work; the colors obtained are often very brilliant and beautiful. They can be made–indeed, in view of the uncertainties of getting delicate petals home in good condition, they are often best made —in the field. The modest apparatus needed is not very cumbersome to carry, especially if one has the use of a motor-car to carry him near to the theater of operations. My own outfit packs nicely into a small old travelling bag about a foot long. It consists of a pint bottle of distilled water, a smaller bottle of alcohol (grain alcohol if you can get it), a can or two of sterno, matches and two test tubes for making solutions; a large glass rod for handling or macerating petals in the test-tubes; a small vial of concentrated hydrochloric acid, one of concentrated ammonia and two small glass rods for transferring drops of these reagents to the pigment solutions; a few half-ounce homoeopathic vials in which to make the tests; and a note-book for recording results. Solutions are made by boiling petals for a few seconds in distilled water in a test–tube held over the sterno, or by soaking them for a few minutes in alchohol. One method is best in some instances, the other in others. In case of doubt, try both, as I usually do. If your supply of canned heat gives out, a rather weak and murky, but usable solution may be made, in some cases, by macerating the petals in cold water. Occasionally this gives a somewhat different result from the boiled solution; it might be worth trying sometimes as a check. Only very small quantities of the solutions are needed; the less water or alchool one uses in proportion to the bulk of petals, the stronger in color and better will be the solution obtained. When the solution is ready, part of it is poured into one of the small vials, a drop of acid added and the resultant color-change, if any, noted. Another portion is placed in another vial and a drop of ammonia added to it. If acid changes the color the original hue can often be brought back by adding enough ammonia to neutralize the acid; and vice versa.

I have generalized somewhat freely in giving these directions; as a matter of fact, the tests I have actually made are so few (and I am so far from being a chemist) that it is with some trepidation I write about them at all. Nevertheless, so far as they go, they give apparently consistent results. They show four types of reaction, as follows.

A. Solutions from the petals of white flowers, whether normally so or albino forms, give, as might be expected, almost wholly negative results. They are unchanged with acid and slightly yellowed with alkali.

B. Solutions from blue, purple, magenta, pink, and red flowers turn pink or red with acid or retain those colors if they had them originally. With ammonia they turn first a greenish blue (or bluish green (it is hard sometimes to tell just what to call this color) changing presently to greenish yellow, pale yellow, or to an almost colorless condition. If too much ammonia is added, the yellowish color appears at once without the intervening greenish or bluish stage. These are, of course, well-known anthocyan reactions. Since anthocyan pigments occur dissolved in the cell-sap and flowers of this series make almost equally good solutions in water and in alcohol (and probably would in any neutral liquid which would mix with water), and since the colors of the flowers are anthocyan colors, it seems safe to assume that we have here cell-sap pigments of that class. . The change of the solution from blue to pink with acid is exactly what occurs when the hepatica, for instance, develops a pink form; the change to greenish blue with ammonia parallels that in the withering flowers of *Desmodium*. It would appear, then, that this type of color variation occurs in flowers having anthocyan pigments, that pink forms of normally blue flowers develop in individuals in which the cell-sap is, for some reason, more acid than is usual in the species, and that, as was long ago postulated for boraginaceous flowers which are pink in the bud and blue when mature, an alkaline condition develops in the withering flowers of the *Desmodium*.

C. Solutions from some yellow flowers are unchanged with acid (at least at first; I am not sure that they might not turn green if left to stand for several hours) and slightly deepened in color with ammonia. Since these flowers do not give good solutions with water but only with alcohol, their pigments may

be assumed to be of the plastid type—that is, they occur, as chloropyll does, in small particles which are nearly or quite insoluble in water but more readily soluble in alcohol or other solvents of fat.

It may be noted that the flowers which give anthocyan reactions are precisely those in which albinism is commonest; it is at least very rare in those giving plastid reactions. It would seem, then, to be a phenomenon associated with anthocyan rather than with the apparently more stable plastid pigments.

D. Certain other yellow flowers give about equally good solutions in water and in alcohol; these are unchanged, or practically so, with acid but turn a brillant deep red with ammonia. This reaction I have happened to see only in *Coreopsis lanceolata*. The color produced with ammonia is essentially the same as that which occurs at the base of the rays in other species of *Coreopsis*, in some color-forms of *Rudbeckia hirta* and in some of the western cone-flowers. Probably we have here the third of the "fundamental" plant pigments listed in the books—an unnamed, primarily yellow pigment occurring dissolved in the cell-sap.

The change from yellow to red with ammonia resembles the color variation in *Trillium*, etc., described in paragraph 5 above; but it is not what happens in those cases. Typical *Trillium erectum* and *Castilleja coccinea* and the red form of *Pedicularis canadensis* give the regular anthocyan reaction as in B. The yellow forms of all these give the plastid pigment reaction as in C. A solution from bracts of *Castilleja coccinea* which had been boiled until all the red color had disappeared also gave the C reaction. I could not get as clear-cut results from the *Trillium* or the *Pedicularis;* in them, the boiled petals continued to give a weak anthocyan reaction. Nevertheless it seems to me likely that in all these cases, as with the xanthophyll and erythrophyll of autumn leaves and other instances described in the books, two pigments are concerned, a red anthocyan and a yellow plastid. The latter is masked by the former when that is present, but comes into its own when for any cause the anthocyan is withdrawn.

How much value the results of these rough and simple tests have, the experts must determine. But they seem to be consistent and coherent as far as they go; and the getting of them is good fun. I recommend it to anyone in search of new ways of botanizing.

East Hartford, Conn.

SOME INTERESTING PLANTS FROM LONG ISLAND, N. Y.

By William C. Ferguson

The following plants were collected by the writer mostly during solitary rambles, with the following exceptions.

Phaseolus polystachyus, while with Mr. Roy Latham, of Orient.

Epilobeum palustre and *Cassia marilandica* were collected by Mr. Norman Taylor of the Brooklyn Botanic Garden while with the writer.

Filix fragilis, and *Gentiana crinata* were collected by the late Thomas Lynton Briggs and Walter S. Allen, both of Flushing.

Both *Corallorrhizas* by Mr. Allen.

In determining the rarity of these plants the writer was guided by "Flora of the Vicinity of New York" by Mr. Norman Taylor, who kindly checked up a part of the list with discoveries made since his book was published.

Eupatorium Torreyanum is new to the area covered in "Flora of the Vicinity of New York."

Lycopodium carolinianum is new to New York state.

These plants marked A are new to Long Island, or have been reported but with no herbarium specimens.

Those plants marked B the writer has found only in the locality cited. In all other cases the plants have been found in other localities than those cited.

The collecting period—1918–19–20–21.

The naming has been very kindly verified or corrected by the following authorities.

Gramineae—Mrs. Agnes Chase

Cyperaceae—Dr. N. L. Britton, Mr. K. K. Mackenzie

Polygonaceae–Dr. John K. Small

Violaceae—Dr. Ezra Brainerd

Lentibulariaceae—Dr. John H. Barnhart

Bidens—Mr. Earl E. Sherff.

The other at the N. Y. Botanical Garden, by Dr. P. A. Rydberg, Dr. Francis P. Pennell, Mr. Percy Wilson.

POLYPODIACEAE

A.B. *Filix fragilis* (L.) Underw. Cold Spring Harbor

EQUISETACEAE

B. *Equisetum fluviatile* L. Sag Harbor

LYCOPODIACEAE

A.B. *Lycopodium carolinianum* L. Ronkonkoma

ZANNICHELLIACEAE

A.B. *Potamogeton natans* L. Yaphank.

ALISMACEAE

B. *Helianthium parvulum* (Engelm.) Small. Queens.

GRAMINAE

B. *Zizania aquatica* L. Flushing.

B. *Muhlenbergia tenuiflora* (Willd.) B. S. P. N. W. of Plattsdale.

A.B. *Brachyelytrum erectum* (Schieb.) Beauv. Plattsdale.

B. *Sporobolus uniflorus* Muhl. Central Islip.

B. *Triplasis purpurea* (Walt.) Chapm. Riverhead.

A.B. *Leptochloa fascicularis* (L.) A. Gray. Montauk.

B. *Aristida tuberculosa* Nutt. Ronkonkoma. Good Ground.

A.B. *Panicularia pallida*, var. *Fernaldii* Hitchc. Pine Stream. Near Rockville Center.

A. *Panicum longifolium* Torr. Meadowbrook.

Panicum villosissimumi Nash. Smithtown.

A.B. *Panicum pseudopubescens* Nash. Valley Stream. South of 3 Mile Harbor.

A.B. *Panicum commutatum* Schultes. Cypress Hills.

B. *Panicum auburne* Nash. Ronkonkoma. Shoreham. Wading River. Garden City. Hempstead Reservoir.

CYPERACEAE

B. *Carex polymorpha* Muhl Hempstead Reservoir.

A.B. *Carex squarrosa* L. Queens.

A.B. *Carex scoparia*, var *tessellata* Fernald. Montauk.

B. *Carex Collinsii*. Wyandanch.

B. *Carex lasiocarpa* Ehrh. Ronkonkoma.

B. *Carex rostrata* Stokes. Ronkonkoma.

B. *Carex scabrata* Schwein. Millneck. Co'd Spring Harbor.

B. *Carex oblita* Steud. Roosevelt.

A.B. *Carex aestiviliformis* Mackenzie. Roosevelt.

Carex atlantica Bailey. Merrick, Wyandanch.

A. *Carex styloflexa* Buckley. Millneck.

A. *Carex abscondita* Mackenzie. Cold Spring Harbor.

A.B. *Carex gracillima* Schwein. Kissena, Flushing.

A. *Carex straminea* Willd. Roosevelt.

Carex plano Mackenzie. Millneck.

Cyperus ferax L. L. Richard. Millneck.

B. *Eleocharis Engelmannii* Steud. Montauk. Cypress Hills.

B. *Eleocharis melanocarpa* Torr. E. of Middle Island.

B. *Eleocharis tricostata* Torr. E. of Middle Island.

B. *Fuirena squarrosa* Michx. Wading River.

B. *Rynchospora corniculata* (Lam.) Gray. Smithtown.

B. *Scirpus cyperinus-Andrewsii* Fernald. Millneck.

B. *Scirpus subterminalis* Torr. Yaphank, Ronkonkoma.

JUNCACEAE

B. *Juncus scirpoides* Lam. Rockville Center.

MELANTHACEAE

A.B. *Melanthium latifolium* Desr. N. of Plattsdale.

ORCHIDACEAE

B. *Gymnadeniopsis clavellata* (Michx.) Rydb. Wyandanch.

B. *Corallorrhiza maculata* Raf. N. of Deer Park. Success Lake.

B. *Corallorrhiza odontorhiza* Nutt. N. of Deer Park.

Limodorum tuberosum L. Meadowbrook.

Leaf 30 cm. x 3¼ cm. Flowers subtended by very conspicuous bracts of the following lengths starting with the lowest. 5 cm., 4¾ cm., 8½ cm., 9 cm., 6 cm., 5½ cm., 3 cm. Seven bracts in all and 1 to 3 m.m. wide. Raceme 15 c.m. long. Rev. Dr. H. M. Denslow kindly compared this plant with sixty-nine sheets in Herbarium of N. Y. Botanical Garden, localities extending from Newfoundland to Alabama. A few of the more southern plants had leaves approaching the above in size but none as large. *All* had the very small bracts characteristic of the species. Have seen but a single plant and the question is whether it is a new species or an abnormal form of *Limodorum tuberosum.*

SALICACEAE

Salix Bebbiana Sarg. Central Park.

B. *Salix lucida* Muhl. Central Park. Sag Harbor.

POLYGONACEAE

B.A. *Persicaria setacea* (Baldw.) Small Montauk. Plattsdale.

B. *Persicaria amphibia* (L.) S. F. Gray. Cypress Hills.

B. *Polygonum buxiforme* Small. Montauk.

B. *Rumex persicarioides* L. Montauk. Point O'Woods.

CHENOPODIACEAE

B. *Chenopodium rubrum* L. Montauk.

AMARANTHACEAE

B. *Amaranthus pumilus* Raf. Point O'Woods.

ALSINACEAE

B. *Arenaria caroliniana* Walt. Napeague.

PORTULACEAE

B. *Claytonia virginica* L. Millneck. N. W. of Plattsdale.

RANUNCULACEAE

B. *Aquilegia canadensis* L. Montauk.

CRUCIFERAE

B. *Arabis canadensis* L. Millneck.

DROSERACEAE

B. *Drosera filiformis* Raf. Wading River.

SAXIFRAGACEAE

B. *Micranthes virginiensis* (Michx.) Small. N. of Kew Gardens Northport.

B. *Micranthes pennsylvanica* (L.) Haw. Millneck.

ROSACEAE

Agrimonia rostellata Wallr. Southold.

AMYGDALACEAE

B. *Prunus pennsylvanica* L. f. King's Park.

A.B. *Prunus cuneata* Raf. Central Park. Medford. Hempstead Plains (Isle of Pines).

CAESALPINACEAE

B. *Cassia marilandica* L. S. W. of Roslyn.

FABACEAE

B. *Lathyrus palustris* L. Easthampton.

B. *Phaseolus polystachyus* (L.) B. S. P. Southold.

GERANIACEAE

B. *Robertiella Robertiana* (L.) Hanks. Point O'Woods.

POLYGALACEAE

B. *Polygala lutea* L. Central Islip.

CALLITRICHACEAE

B. *Callitriche palustris* L. Bayside.

ANACARDIACEAE

B. *Rhus hirta* (L) Sudw. Albertson. Montauk. Point O' Woods. Hempstead Reservoir.

BALSAMINACEAE

B. *Impatiens pallida* Nutt. Roslyn.

HYPERICACEAE

B. *Hypericum majus* (Gray) Britton. Montauk. Queens. Flushing.

CISTACEAE

B. *Lechea tenuifolia* Michx. Wading River. N. of Pinelawn.

VIOLACEAE

A.B. *Viola incognita* Brainerd. N. of Merrick.

A.B. *Viola incognita* var. *Forbesi* Brainerd. Cold Spring Harbor. Millneck.

LYTHRACEAE

B. *Rotala ramosior* (L.) Kuhn. Cypress Hills.

ONAGRACEAE

A.B. *Epilobium palustre* L. Central Islip.

AMMIACEAE

B. *Zizia cordata* (Walt.) D. C. N. of Kew Gardens.
B. *Zizia aurea* (L.) Koch. N. of Kew Gardens.

CORNACEAE

A.B. *Cornus rugosa* Lam. King's Park.

VACCINIACEAE

B. *Gaylussacia dumosa* (Andr.) T. & G. Central Islip.

GENTIANACEAE

B. *Dasystephana saponaria* L. Meadowbrook.
B. *Dasystephana Andrewsii* Griseb. Millneck.
B. *Gentiana crinata* Froel. N. W. of Brentwood.

MENYANTHACEAE

B. *Nymphoides lacunosum* (Vent.) Kuntze. Wyandanch.

SCROPHULARIACEAE

B. *Agalinis virgata* Raf. Ronkonkoma. Central Islip.

LENTIBULARIACEAE

B. *Stomoisa juncea* (Vahl.) Barnhart. Flanders.
A.B. *Setiscapella subulata* (L.) Barnhart. Ronkonkoma. Central Islip. Wading River.
Utricularia pumila Walt. Ronkonkoma.

RUBIACEAE

B. *Galium lanceolatum* Torr. N. W. of Plattsdale.

CAPRIFOLIACEAE

A.B. *Viburnum Lentago* L. Kissena, Flushing.

LOBELIACEAE

B. *Lobelia siphilitica* L. Bayside. Flushing.

CICHORIACEAE

B. *Hieracium canadense* Michx. King's Park.

COMPOSITAE

B. *Eupatorium rotundifolium* L. Hempstead Plains. Garden City.

A.B. *Eupatorium Torreyanum* Short. Hempstead Plains. Garden City.

B. *Gnaphalium Helleri* Britton. Ronkonkoma.

Bidens discordea (T. & G.) Britton. Montauk. Smithtown. Plattsdale.

B. *Bidens comosa* (Gray) Wiegand. Hempstead Plains. Garden City.

B. *Bidens trichosperma-tenuiloba* (Gray) Britton. Point O' Woods.

B. *Bidens* (*cernua* × *connata*). N. W. of Plattsdale.

B. *Coreopsis rosea* Nutt. Wading River. Bridgehampton.

B. *Aster nemoralis* Ait. S. of Flanders.

B. *Erigeron ramosus-discoidens* Robbins. Montauk.

B. *Solidago patula* Muhl. Millneck. Flushing. Bayside.

B. *Solidago Elliottii* T. & G. Central Islip. Easthampton. Hempstead Reservoir.

A.B. *Doellingeria humilis* (Willd.) Britton. Millneck.

SHORTER NOTES

Some Plants of Chimmons Island

R. C. Benedict

Chimons Island is one of the group of islands in Long Island Sound extending east and west along the Connecticut shore near South Norwich. Chimons is one of the largest, measuring 78 acres, most of which is arable land, though the greater part is given over to wild growth principally bayberry, sumac, and blackberry. Apparently the only kind of tree which has grown up naturally on the island is the Ailanthus, illustrating very interestingly the distribution of this tree by wind. A considerable growth of maples, and a few poplars and elms were established after repeated failures, and some of the maples are now of considerable size. The difficulty in connection with the trees seems to relate, at least in part, to the wind-swept condition. An interesting question suggests itself as to whether if Ailanthus is allowed to grow until it has formed wind-breaks of sufficient

density, other trees distributed by wind or bird may not then become naturally planted.

In the course of three summers on the island only three ferns have been found, and as might be expected, these are species independent of tree shade. The species are; the lady fern, the hay scented fern, and the marsh fern. There is a possibility that some of the thickets and boggy places may harbor some of the low growing forms like *Ophioglossom* or the smaller forms of *Botrychium*, but so far these have not been seen.

Brooklyn Botanic Garden.

Goldie's Fern (*Dryopteris Goldieana*)

As the Torrey Botanical Club contemplates taking the Decoration Day Field Trip this year to Branchville, New Jersey, it may be of interest to note that there is an excellent station in that region for the rather scarce but beautiful fern, *Dryopteris Goldieana*.

Although this fern has rather a wide distribution, it is apparently never plentiful anywhere, and in Britton's Catalogue of Plants of New Jersey, only three stations are recorded for the state. None of these are in Sussex County.

Scarcely more than a hundred yards from the hotel, known as "The Pines," near Branchville, there is a limestone rock or boulder, probably ten feet across, covered with Goldie's fern. Around the edge of this rock and near it, are also growing many fine plants of this species.

This station for Goldie's fern may be familiar to others but I did not know of it until I came across the plants last August.

Oliver P. Medsger,
Arlington, N. J.

BOOK REVIEWS

Macbride's North American Slime-Moulds*

Both student and nature lover will welcome the appearance of Professor Macbride's long-looked-for revision of the North American Slime-Moulds, for in spite of its obscurity, this group

*Macbride, T H. North American Slime-Moulds, pp. I-XVII, 1-299. The Macmillan Co., New York, 1922.

of organisms is of like interest to the professional botanist and the amateur. Standing as they do on the border line between animals and plants or as suggested by the author of the book, perhaps outside the pale of either, they furnish a most fertile field for the speculation of the student. Consisting, as they do in their vegetative stage, of a naked mass of liquid protoplasm which, unlike all other liquids, defies the laws of gravity and persistently flows up hill instead of down, these organisms never cease to arouse the interest of the nature student, provided their eyes have been keen enough to detect them at all or someone has directed their attention to them.

Add to this the varied and fantastic shapes which are assumed by the fruiting stage of the slime-moulds and which adorn the ugly surface of rotting logs with minute feathers and cushions of the most delicate structures and beautiful colors and it is difficult to select any group of either animals or plants which can furnish a more fascinating subject for observation and study. Only one other thing is necessary to make this work a great success and that is the personality of the man behind the book which while it may shine out through the printed page can never be fully appreciated unless one, like the writer, has come into personal contact with its author in the class room.

In matters of nomenclature the author has not followed hard and fast rules but has apparently attempted to use the oldest recognizable specific names without regard to rule or date. As to genera he has again followed usage rather than rule. He has attempted to correlate the work of America and Europe so that the species common to the two continents will appear under the same names in the standard American and European works, where the identity can be agreed upon. One other very commendable feature of the book is the extensive notes and observations which supplement the technical descriptions.

The illustrations consist of twenty-three plates as compared with eighteen in the old edition. The plates are made in half tone from photographs and drawings showing habitat sketches and microscopic details. The drawings are very well done, the sculpturing of the spores and capillitium being so well shown that they cannot fail to arouse in the reader a desire to actually see and know more of these wonderful organisms. No colored illustrations are used. A copy of this book should be in the hands not only of every botanist but also of every nature stu-

dent who loves to ramble through the woods and fields in search of natural objects of interest.

F. J. Seaver

PROCEEDINGS OF THE CLUB.

Meetng of March 14, 1922.

The meeting was held at the American Museum of Natural History.

The following were elected to membership: Mrs. Ellis Parker Butler, Flushing, New York, Mr. Edgar Nelson, Flushing, New York Dr. Eda M. Rounds, Providence, R. I., Dr. Charles Vetter, New York City.

The resignation of Mr. N. A. Lawrence was accepted.

It was voted to endorse a project to establish a Northeastern Forest Experiment Station and the Secretary was instructed to write letters to Congressmen in support of a bill recently introduced to accomplish this end (S. 783 and H. R. 9689).

The scientific program consisted of an illustrated talk on "Botanizing in British Guiana" by Dr. H. A. Gleason. Dr. Gleason left New York June 2, 1921, spent ten weeks in collecting, and returned to New York, September 6. Field work was considerably hampered by the almost incessant rains of the season, but almost a thousand numbers and some four thousand specimens were obtained. Most of these were collected in the dense tropical rain forest along the Essequibo and Potaro rivers, from 75 to 175 miles back from Georgetown, but an interesting series was also secured from the open forest on the white sands lying between the Essequibo and Demerara rivers. The most noteworthy families represented are the Rubiaceae, Melastomataceae, and Leguminosae in the old sense. A few new species have already been found in the collections, and one represents an apparently new genus of the Rapateaceae.

After discussion, adjournment followed.

Marshall A. Howe
Secretary.

Meeting of March 29, 1922

This meeting was held in the botanical lecture-room of Schermerhorn Hall, Columbia University.

Mr. Bayard Long was elected the Club's delegate to the twenty sixth annual meeting of the American Academy of

Political and Social Science in place of Dr. F. W. Pennell, who is unable to serve on account of absence in South America.

Prof. Willard M. Porterfield, a graduate student at Columbia University, was elected to membership.

Mr. Morten P. Porsild, Director of the Danish Arctic Station on Disko Island, Greenland, presented a valuable communication on "The Flora of Greenland: Its Affinities and Probable Age and Origin." An abstract furnished by the speaker follows:

At present we know from Greenland 416 species of vascular plants, 608 bryophyta, 717 fungi,, 285 lichens, 181 marine algae, 363 fresh water algae, 617 diatoms, and 41 dinoflagellates. In the present remarks the term "flora" means only the vascular plants, the cryptogams of some of the adjacent countries being still too imperfectly known for comparisons. The flora of Greenland was considered by J. D. Hooker (1861 and 1875) to be mainly of Scandinavian origin and the view has been repeated by recent writers, although both Joh. Lange (1880) and Eug. Warming (1888) have raised objections against it. Warming supposed that the main stock of the flora might have survived the Great Ice Age on ice-free mountain peaks, supposed by some geologists never to have been covered by ice, as is indicated by their present rugged surface.

According to the general distribution of each single species, we may divide the plants in different types:

Western	*W+E*	*Eastern*	*Percentages*
III 9.2	II 6.7	I 2.3	*Northern 18.2*
VI 3.7	V 17.5	IV 0.2	*Widely distributed 21.4*
IX 12 7	VIII 31.4	VII 16.3	*Southern 60.4, of* which 22 are temperate
25.6	55.6	18.8	100—

The table shows that *the western element is greater than th- European and that four fifths of the flora may as well have immie grated from the west as from the east.*

As erratic blocks actually have been found on several rugged peaks and as the weathering action of the arctic climate will produce rugged alpine surfaces, even when the peaks have been rounded by ice action (R. S. Tarr), it seems improbable that any considerable part of the flora of Greenland has survived the Great Ice Age, at least *a surviving would be impossible to the great southern element,* three fifths of the flora, now found only in sheltered lowland positions. If that element could immigrate in post-glacial time, it would be much easier for the arctic element.

As Greenland is separated towards the East, West, and South by great distances of sea and only towards the north has it a neighboring country still poorer in plants than itself, the difficulties of immigration under present climatic conditions are very great. Geologists also deny the existence of post-glacial land-connections with Greenland. The problems of immigration would be much easier, if we assume for the Arctic countries *a post-glacial warmer epoch,* in analogy with facts established for Northern Europe.

An actual evidence of a more genial climate in Greenland was found by Ad. S. Jansen and P. Harder in the occurrence of bivalves in raised marine beds at 68° N. lat., of which no living specimens are known north of the estuary of the St. Lawrence River. The difference in the present average temperatures of the warmest month of the places mentioned is at least 14° *F.*

If a milder post-glacial epoch could be affirmed generally for Northern America, it probably would yield an explanation of the fact that the present habitations of the Eskimo everywhere are bordered with a broad zone formerly inhabited but now uninhabitable. And if that epoch was contemporaneous with the North European, ending about 1000 B. C., it might *place the dispersal of the Eskimo and the development of their culture to completeness back to the Neolithic Age.*

After discussion of Mr. Porsild's paper, the meeting adjourned.

MARSHALL A. HOWE
Secretary.

NEWS ITEMS

In the March-April number of Torreya the printer made it appear that Dr. Francis W. Pennell was in Columbia, S. C. Dr. Pennell is continuing the study of the flora of the high Andes of Colombia, South America, that he began in the fall of 1917. With him is Dr. Ellsworth P. Killip of the U. S. National Museum. The expedition was sent out by the New York Botanical Garden, the Gray Herbarium of Harvard, the Academy of Natural Science of Philadelphia and the United States National Museum.

Dr. John K. Small has just returned to the New York Botanical Garden from two months of study and exploration in Florida, continuing his previous investigations of the flora under the patronage of Mr. Charles Deering.

The May number of the American Forester contains an article on Our Vanishing Wild Flowers by Winthrop Packard. The article, which is accompanied by excellent photographs of some of the most attractive of our wild flowers, is a plea for the protection of the flowers.

Sir Isaac Bayley Balfour. The announcement has just been made of the retirement of the eminent keeper of the Edinburg Botanical Garden and Professor of Botany in the University of Edinburg. In this muddled world, with all its conflicts and misunderstandings, it is easy to lose faith in the capacity of mankind for decent civilization. In such moments of pessimism, it is worth a good deal to have seen such a man as Professor Bayley Balfour. Possessing seemingly equal abilities for botanical research, teaching, and administration, together with unbounded enthusiasm and untiring energy, he more than maintained the already very high traditions of Scottish botany. Doing this he also won the full support and esteem of his fellow citizens.—T. D. A. Cockerell.

The hairy Solomon's seal, *Polygonatum biflorum*, with slender stems and twin flowers, was just coming into bloom

in the southern foothills of the Catskills on May 15 at elevations below 1000 feet. One of the largest and thickest patches I ever saw was found on a rocky knoll at Yama Farms, near Ellenville, growing in shallow soil on a great mass of Lower Devonian sandstone partly shaded by small scrub oaks.—W. A. Murrill.

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SOME PINE-BARREN BOGS IN CENTRAL ALABAMA

Roland M. Harper

From Delaware to northern Virginia and from central North Carolina to Tennessee, there is at the inner border of the coastal plain a hilly belt several miles wide, characterized by large amounts of sand, gravel, or mottled clay of fresh-water origin, all deficient in fossils and in line, and making rather poor soils, with a considerable development of pine forests. The clay seems to predominate in Maryland and the sand in the Carolinas and Georgia, while the gravel is most abundant in Alabama and Mississippi.*

East of the Potomac River and west of the Flint River the pine-clad hills near the fall-line are separated from the pine-barrens nearer the coast by a fertile strip underlaid by calcareous strata mostly of late Cretaceous age, which many typical pine-barren species have apparently been unable to cross.† It is

* Geologists are not yet completely in agreement as to the age of these deposits. Those in Maryland are referred without question to the Potomac group (Lower Cretaceous). The sand-hills of North Carolina are regarded by L. W. Stephenson (N. C. Geol. Surv. Vol. 3: 261. 1913) as belonging to the Lafayette (Pliocene), while about a year before the same author (Geol. Surv. Ga. Bull. **26**: 450–454. 1912) was inclined to treat the same sort of thing in Georgia as residual from the Cretaceous formations. The corresponding region in Alabama is based on the Tuscaloosa formation (E. A. Smith, Geol. of Coastal Plain of Ala. 307–349. 1895), which is now regarded by members of the U. S. Geological Survey as being Lower Cretaceous east of the Coosa River and Upper Cretaceous west of there.

† For quantitative lists of trees in different parts of the fall-line hills, with references to earlier publications, or other additional information, see the following:—

Maryland: Jour. Wash. Acad. Sci. **8**: 584. Nov. 1918. (Map in Jour. Forestry **17**: 548. 1919.)

North Carolina: Jour. Elisha Mitchell Sci. Soc. **33**: 112. 1917.

South Carolina: Bull. Torrey Bot. Club **37**: 413. 1910; 38: 225. 1911. (Map in Jour. Elisha Mitchell Sci. Soc. **35**: *pl. 29*. 1920.)

(*Continued at bottom of following page.*)

therefore of considerable interest to ascertain what species regarded as rather typical of the pine-barrens occur more or less isolated near the fall-line. For some reason not altogether obvious, the plants growing on uplands and along the larger streams in the region under consideration are mostly of widely distributed species, and the rarities are to be looked for in bogs.

In Maryland, where the soil is mostly clayey, the bogs are small and scarce and hard to find; and they are mostly of a peculiar type described by McAtee a few years ago*, characterized by very large quartz pebbles on hillsides. In the fall-line sand-hills of the Carolinas and Georgia sandy bogs with quite a number of interesting plants (such as *Chamaecyparis* and *Sarracenia flava*) are not infrequent, but they become scarcer again in Alabama, where the soil is more clayey.

In the greater part of the central long-leaf pine belt of Alabama the smaller streams dry up in summer, probably because the hottest months are drier than they are farther east. But in Chilton and Autauga Counties, between Maplesville and Prattville, and particularly between Adams and Billingsley, there are quite a number of pine-barren bogs where the water seeps out perpetually on gravelly slopes. Those which I have examined are close to the Mobile & Ohio (formerly Montgomery, Tuscaloosa & Memphis) R.R., which was built in the last decade of the 19th century. Although Dr. Charles Mohr may have traveled on this railroad toward the close of his life, there is little or no evidence of the fact in his Plant Life of Alabama (1901), and the railroad is not shown on the map which forms the frontispiece of that great work.

I walked past a few of these bogs in the northwestern part of Autauga County on Dec. 10, 1905, and examined quite a number of them in Chilton County on April 28, 1921, my attention having been attracted by a pitcher-plant seen from the train two days before. The same thing when seen in Autauga County in the winter I had referred with some hesitation to *Sarracenia Sledgei*, the westernmost species of the genus,† but when in

Georgia: School Sci. & Math. **18**: 706. Nov. 1918. (Description in Ann. N. Y. Acad. Sci. 17: 14. Nov. 1906.)

Alabama: Geol. Surv. Ala. Monog. **8**: 78–81, 152–153. 1913; Soil Science **4**: 98–99. 1917.

* Bull. Biol. Soc. Wash. **1**: 74–90. May, 1918.

† See Jour. Elisha Mitchell Sci. Soc. **34**: 119. Oct. 1918.

bloom in April it was easily recognized as *S. rubra*, a well-known species, which however had not been reported so far inland in Alabama before. (Dr. Mohr knew it only from the "Lower pine region" and "coast plain.") I have also observed the bog vegetation from the car window at various times, the latest being on June 30, 1922.

In the region under consideration there are all gradations between bogs and swamps, but the most typical bogs are very pebbly and located on rather steep slopes, thus resembling those of Maryland, except for the pebbles being smaller. The woody plants are rather small and scattered, and the bulk of the vegetation is made up of light-loving herbs with narrow or reduced leaves. The commonest species, as nearly as could be determined by observations on one day in December and one in April, and a few glimpses from a moving train, are listed below. No doubt a little field work in summer or fall would extend the list considerably and change the sequence a little. Species noted only once are omitted. The letter N after the name of a species means that it had not previously been reported from north of the black belt in Alabama.

WOODY PLANTS	HERBS
Magnolia glauca	*Eupatorium rotundifolium*
Alnus rugosa	*Andropogon glomeratus?*
Arundinaria tecta	*Juncus trigonocarpus N*
*Myrica Carolinensis**	*Eriocaulon decangulare* N
Viburnum nudum	*Sarracenia rubra N*
Aronia arbutifolia	*Osmunda cinnamomea*
Acer rubrum	*Coreopsis gladiata* N
Rhus Vernix	*Drosera capillaris* N
	Aletris aurea N
	Tofieldia racemosa N
	Pinguicula pumila N
	Xyris sp.
	Eryngium virgatum
	Utricularia subulata†

* See Bull. Torrey Club **33**: 528. 1906; **36**: 590. 1909; Torreya **10**: 221. 1910.

† Known to Dr. Mohr only from near the coast, but found by the writer on Lookout Mountain in 1905.

Ilex coriacea

Ascyrum stans

Smilax laurifolia

Rhexia Alifanus‡
Viola primulifolia
Eleocharis tuberculosa§
Rhynchospora glomerata paniculata
Sabbatia macrophylla N
Pogonia ophioglossoides
Lycopodium alopecuroides N
Helianthus angustifolius
*Rhynchospora rariflora***

MOSSES

Sphagnum sp.

Another noteworthy plant occurring in the central pine belt and not elsewhere within a hundred miles, as far as known, is *Pinus serotina*, found by the writer in sour swamps in Chilton and Autauga Counties but farther east than the bogs here described.*

In the above list evergreens are slightly in the majority among the woody plants, and most of them have fleshy fruits. Among the herbs monocotyledons and dicotyledons are nearly equal in number of species, but the former are more numerous in individuals, as in most bogs and marshes the world over.

The interested reader may find it worth while to compare this list with one for streams in the Hempstead Plains of Long Island (Mem. Torrey Club **17**: 276–278. 1918), McAtee's Maryland list previously referred to, one for moist pine-barrens in Georgia (Ann. N. Y. Acad. Sci. **17**: 54–59. 1906), and Dr. Mohr's lists of moist pine-barren plants in southern Alabama (Contr. U. S. Nat. Herb. **6**: 116–117, 119–121. 1901).

University, Ala.

‡ Long known as *R. glabella* Mx., a later name. (See Bull. Torrey Club **33**: 238. 1906; Rhodora **17**: 132. 195.) Reported by Dr. Mohr as having been found by Dr. Eugene A. Smith near Coosada, which is in this same central pine belt, and might be another locality for several of the species here discussed.

§ Dr. Mohr knew this no farther inland than Autauga County, but I found it in Cherokee County in 1906. See Bull. Torrey Club **36**: 591. 1909.

** See Torreya **10**: 222. 1910.

* See Bull. Torrey Club **33**: 524. 1906.

ICE STORMS AND TREES

Walter E. Rogers

Several papers, particularly those of Harshberger[1] and Illick[2], have given accounts of ice storms and some of their effects on trees. Both of the studies cited were conducted in Pennsylvania and apparently little data on this subject has heretofore been collected outside the Atlantic coastal territory. It is thought that data from a different climatic district will be of some interest.

Opportunity for study of ice storms in their relation to trees in the Middle West was afforded by the visit in 1922 of two of these storms to central Wisconsin. The first occurred late in February and was heavily destructive; the second came late in March, was much less severe and was easily withstood by the trees.

The first storm began on February 21, with a light rain falling and with the thermometer registering slightly below freezing. The rain froze immediately wherever it fell. By the following morning ice had accumulated in considerable quantities on all trees. Twigs of *Acer saccharum* examined at the time showed marked increases in diameter and weight. Meteorological conditions remained practically constant for many hours more. Following the storm a period of cold weather made it possible to study the accumulations of ice on various plants.

Increase in Twig Size

Most of the measurements of twigs were made in the field. Readings were made directly from a millimeter scale which was held against the stems. The great majority of stems had accumulated thicker ice layers on the windward side and measurements of the greater and lesser diameters were necessary. These were made, in each case, at the same point on the twig. The results appear in the following table.

[1] Harshberger, John W.: The Relation of Ice Storms to Trees. Contrib. Bot. Lab. Univ. of Penna., II: 345–349, 1904.

[2] Illick, J. S.: A Destructive Snow and Ice Storm. Forest Leaves, XV, 103–107, Feb. 1916.

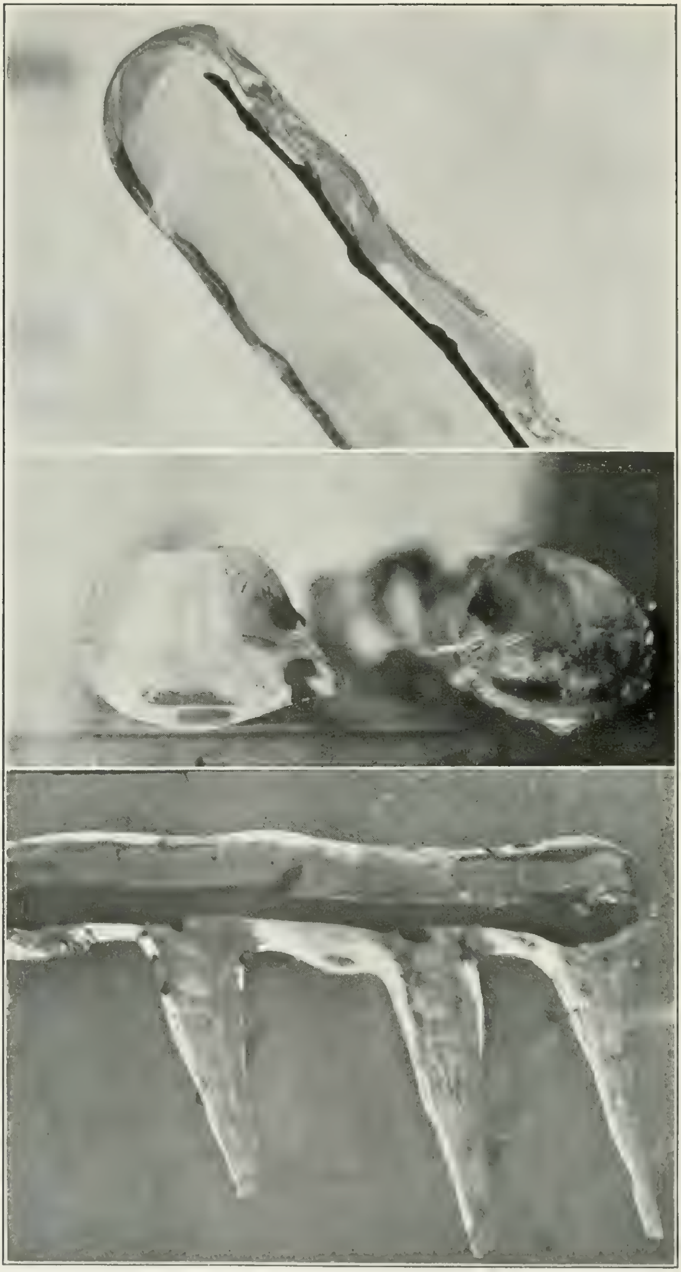
Name	Greater and lesser diameters of part with ice, in millimeters	Average of greater and lesser diameters with ice, in millimeters	Diameter of twig without ice	Increase in diameter due to ice, in millimeters	Percentage of increase
Acer saccharinum[2]	20 × 12	16.0	3.0	13.0	433
Carya ovata[2]	17 × 17	17.0	3.0	14.0	466
Quercus alba[2]	18 × 13	15.5	4.75	10.75	226
Populus deltoides[2]	23 × 17	20.0	4.5	15.5	344
Betula sp.[2]	14 × 10	12.0	1.5	10.5	700
Tilia americana	23 × 23	23.0	3.0	20.0	666
Tilia americana	23 × 19	21.0	2.0	19.0	950
Tilia americana	25 × 20	22.5	2.5	20.0	800
Acer Negundo	26 × 26	26.0	3.5	22.5	642
Acer Negundo	26 × 18	22.0	3.0	19.0	633
Acer Negundo	35 × 20	27.5	4.0	23.5	587
Ulmus americana	26 × 23	24.5	3.0	21.5	716
Prunus sp.	38 × 24	31.0	3.5	27.5	785

Increase in Twig Weight

Twigs from different trees were taken into the laboratory and weighed. After the ice had melted off they were reweighed. Several series from different localities were thus studied at different times. The data is here combined in one table.

Number of twigs	Name	Weight with ice in grams	Weight without ice in grams	Weight of ice in grams	Ratio fo ice weight to twig weight
1	*Tilia americana*	49.0	3.0	46.0	15:1
1	*Acer saccharinum*	54.0	2.0	52.0	26:1
1	*Prunus virginiana*	48.0	2.4	45.6	19:1
1	*Carya ovata*	97.0	3.8	93.2	24:1
1	*Crataegus sp.*	32.0	0.9	31.1	34:5
1	*Fagus grandifolia*	164.0	5.0	159.0	31:1
1	*Carpinus caroliniana*	10.0	1.0	9.0	9:1
1	*Ulmus fulva*	197.5	9.2	188.3	20:1
1	*Picea abies*	117.5	5.5	112.0	20.1
1	*Picea abies*	200.0	11.6	188.4	16:1

[2]Second storm, March 18.



Number of twigs	Name	Weight with ice in grams	Weight without ice in grams	Weight of ice in grams	Ratio to ice weight to twig weight
1	*Picea abies*	695.0	32.9	662.1	20:1
1	*Ulmus americana*	133.0	1.0	132.0	132:1
8	*Salix* (sp. No. 1)	588.5	6.9	581.6	84:1
11	*Salix* (sp. No. 2)	355.0	6.1	343.9	56:1
8	*Quercus rubra*[2]	60.9	9.0	51.9	5:1
7	*Prunus serotina*[2]	88.2	5.5	83.7	15:1
3	*Betula sp.*[2]	74.0	4.0	70.0	17:1
10	*Ulmus americana*	340.0	14.9	325.1	21:1
10	*Betula sp*	220.0	7.35	212.65	30:1
10	*Acer Negundo*	342.5	8.9	333.6	37:1
10	*Populus grandidentata*	797.8	43.7	754.1	17:1
10	*Carpinus caroliniana*	460.0	13.2	446.8	33:1
10	*Ostrya virginiana*	287.0	9.7	277.3	28.1
3	*Quercus alba leaves*[2]	32.0	0.7	31.3	44:1
17	*Pinus laricio needles*	184.0	1.9	182.1	95:1

In reference to the elm twig which showed the greatest increase of weight of any twig studied it should be stated that this was the terminal portion (26 centimeters) of a sprout found growing almost erect in open country. The large amount of ice on it cannot be ascribed to the accumulation of drippings from higher twigs nor to the run-off from higher parts of the same twig. Practically all of the ice had accumulated on the side of the sprout exposed to the northeast, the direction from which the wind came.

Damage to Trees

While practically no species was free from storm injury, there was wide variation in the amount of damage suffered by different trees. Data on storm injury is still being collected and will be presented in a later paper.

Description of illustration.

At top—terminal portion of twig of *Ulmus americana*. Storm of Feb. 21–23. Middle—cross section of twigs of *Prunus* sp. at left, *Ulmus americana* at right. Storm of Feb. 21–23. Bottom—horizontal twig of *Carya ovata*. Storm of March 18.

Lawrence College, Appleton Wisconsin.

[2] Second storm, March 18.

VARIATION IN THE FLOWER OF THE WILD CARROT, (*Daucus carota*, L.)

N. M. Grier

This study has been made with respect to the presence, absence, and degree of development of the purple central flower or florets in the umbels of the wild carrot. There are added in connection those observations of early naturalists seemingly of interest. Flowers from two localities were considered, Cold Spring Harbor, N. Y. and Bellevue, Pa., with the following results.

Localities	No. specimens examined.	No. spec. with purple flower, flowers, or pigmentation in center of umbel	No. spec. without purple flowers etc.
Cold Spring Harbor	3074	1317	1757
Bellevue	3074	292	2782
Totals	6148	1609	4539

From the preceding it becomes clear that at least so far as these localities are concerned, the purple flower when found is in the minority, although more abundant at Cold Spring Harbor. Gray's Manual states that the purple flower is usually present. Upon the basis of a count of a smaller number of specimens, some botanists have thought that the purple central flower is present in about 50% of the plants. The table already presented can give only a rough idea as to the variation in the number of purple flowers, and the distribution of purple pigment in the umbels of the plant. Frequently an entire umbellet is metamorphosed to produce a relatively gigantic purple flower, or there may be many smaller ones of a lighter color representing morphologically one umbellet. Occasionally two umbellets are transformed in a similar fashion. At the extreme, are cases reported me by botanists in which an entire quadrant of an umbel is pinkish, but the flowers otherwise not distinctive. I have seen but one similar case. The variation in the number of the purple flowers, and the distribution of purple pigment in the umbels of the plant is presented in the following compilation, inspection of which indicates further the greater degree of variation among the flowers at Cold Spring Harbor.

One umbellet or morphological equivalent purple pigmented.
No. of dark flowers on umbellets by classes.

Localities	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	19	23	26
Cold Spring Harbor	1208	44	16	12	1	5	2	1		1	3	1	5	2	1	1	1	1
Bellevue	277	5	2		1	4	1	2										
Totals	1485	49	18	12	2	9	3	3		1	3	1	5	2	1	1	1	1

Two umbellets or morphological equivalents purple pigmented
No. of dark flowers on umbellets by classes.

Localities	1	2	3	4
Cold Spring Harbor	16	3	2	1
Bellevue	0	0	0	0
Totals	16	3	2	1

Many botanists have doubtless forgotten Darwin's remarks on the flower of the carrot as given in his work, "Different Forms of Flowers on Plants of the Same Species." Darwin apparently did not make any study similar to this, but contented himself with gathering more general information and speculating upon the probable forces at work. He remarks that sometimes "two or three flowers next to the dark central one are so characterized." He believed that the latter did not make the umbel more conspicuous to insects, and while other investigators believed this flower to be neuter or sterile, he obtained seeds from it by fertilization. A micro-dissection made indicates that the seeds obtained from the purple flower are probably fertile, although the conclusive test would be germination.

Darwin did not consider the dark central flower to be of any importance, but considered it instead to represent a former condition of the species where the central flower alone was female. Its position was held to be the consequence of the fact that when irregular flowers become regular or peloric, they are apt to be central, and such peloric flowers owe their origin to arrested development or reversion. He additionally comments that in other species the larger central blossom may be correlated with the fact that it may be better nourished than the others, and may produce larger or different seeds. Of interest in connection would be some knowledge of the distribution of the purple central flower in the cultivated variety of the carrot, which botanists state to be derived from the wild form discussed. However, there is no record in standard works of horticulture as to the relative abundance of the purple flower in the cultivated variety, and seed growers state that to their best knowledge, (but without extended observation), the cultivated carrot

has the same percentage of purple florets as the wild one, although they have rarely seen more than one purple floret to the umbel. L. H. Bailey writes that in a good number of specimens of the cultivated carrot, there is no trace of a purple flower. This, however, proves nothing, for as we have seen many of the umbels of the wild carrot do not show it. Direct observation has been difficult, as most farmers do not grow their own seed.

Certain marked differences between the wild and cultivated strains, presumably genetic, stand forth. Such concern the characters of edibility, texture of the root, color, etc. It is interesting at this point to recall the experiments of Vilmorin, (Le Bon Jardinier, 1838, p. 16; 1840, p. 195), by which he showed that 3 or 4 generations of cultivation of the wild strain caused it to assume the characters of the cultivated form, especially the ones cited. He observed a gradual transition between the wild and cultivated forms. Vilmorin's experiments were vigorously attacked at the time, other botanists claiming that the results were due to accidental hybridization with the cultivated form, and that the characters of the wild strain were immutable ones. The burden of evidence since accumulated has been in favor of Vilmorin, if only on account of the method of origin of the cultivated carrot. While genetic studies on the wild carrot have been contemplated by some, they have not been made, and until such a time, it is not very profitable to speculate upon the causes of these observed differences. However in the light of our knowledge concerning other plants, one may well understand how differences in genetic strains may account for the qualitative and quantitative differences observed, provided the divergent variation, as manifested even in the small amount of material studied, be taken into consideration. Environment looms up as an important factor when the origin of the wild carrot is taken into consideration Knuth (Blütenbiologie III), indicates species of aphids and wasps as the source of pollination while I have also observed a protectively colored spider and certain beetles in association. An additional clue possibly of aid in pursuing such a study would seem to lie in the fact that if one plant has an umbel with a dark central flower, nearly all the umbels on the same plant have it.

Washington and Jefferson College
Washington, Pennsylvania

SHORTER NOTES

ADDITIONS TO THE FLORA OF THE PRIBILOF ISLANDS

W. L. McAtee

Although considerable collecting has been done, nothing has been published on the flora of these islands since 1899. (Macoun, J. M., in The Fur Seals and Fur-Seal Islands of the North Pacific Ocean, Pt. 3, pp. 559–587, Pls. 87–94). Many of the plants subsequently collected have passed through the writer's hands but of them only *Carex incurva* Lightfoot (identified by J. M. Macoun) is an addition to the list. Specimens were obtained from sandy ground on the east side of the salt lagoon, St. Paul Island, in 1913 by E. G. and A. G. Whitney, and are now in the U. S. National Herbarium.

In stomachs of teal (*Nettion*) collected on St. Paul in August 1914, were seeds and foliage of *Potamogeton filiformis* Persoon, another addition to the flora. These birds were breeding and therefore resident on the island and the plant is one easily overlooked among other aquatic vegetation.

The third species I would mention, *Menyanthes trifoliata* L., is a plant that would hardly be missed, so it may not actually grow on the islands. However, it is of interest to note that the seeds were found in a number of stomachs of shorebirds collected on the islands notably in one of a northern phalarope obtained on St. George, Aug. 5, 1920. The seeds may simply have drifted there, a fact of interest in itself, or it is possible that the plant is established on the islands.

SCIRPUS PEDICELLATUS IN NEW JERSEY

Edwin B. Bartram

While exploring some marshes along the Delaware River in Sussex Co., New Jersey, early in July 1918, my attention was actively drawn to a colony of *Scirpus* confined to a wet, partly shaded opening in the edge of a patch of woods. The plants evidently belonged to the group of which *S. cyperinus* (L) Kunth is our common representative, but they were fully matured with ripe achenes hanging in the tangled pale brown

wool at the base of each spikelet while *S. cyperinus* in a nearby marsh was hardly developed to a stage where the inflorescence was even noticable. A reference to the manual quickly indicated that the plant in question was *Scirpus pedicellatus* Fernald, a well marked species of alluvial thickets and swamps ranging from Quebec and New England westward across the northern border to Wisconsin but not previously known south of Connecticut.

Apart from the earlier flowering period, which is a striking field character even in August when the slender tangled spikelets present nothing but a naked purplish rachis terminated by a tuft of empty scales, the species seems to be quite clearly distinguished from near relatives by well marked characters. The slender pedicelled spikelets readily separate it from *S. cyperinus* in which the spikelets are clustered in close, tight glomerules. From *Scirpus atrocinctus* Fernald it is distinguished by the thicker culms, broad firm leaves averaging about seven millimeters in width, and stramineous involucels almost uniform in color from tip to base. *Scirpus Eriophorum* Mx. with a range from Connecticut to the Gulf States and Arkansas, mostly near the coast, resembles *S. pedicellatus* but the pale brown scales and light colored wool of the latter species shows no trace of the deep red-brown coloring that is so characteristic of *S. Eriophorum.*

When such a pronounced difference is clearly correlated with a perfectly distinct geographical range it would seem consistent to recognize the plant as a definite entity rather than force it into a composite species where its identity and significance would, to a great extent, be lost in an unwieldy series of variants.

Bushkill, Pa.

PROCEEDINGS OF THE CLUB

Meeting of April 11, 1922

The meeting of April 11, 1922, was held in the botanical lecture-room of Columbia University, beginning at 8:15 P. M.

Miss Louise Dosdall, St. Paul, Minn., and Mr. William Gavin Taylor, Bloomfield, New Jersey, were elected to membership.

The scientific program consisted of a talk by Professor H. M. Richards on "Some Impressions of Japanese Vegetation."

The talk was mainly an account of a visit to Japan during the summer of last year. After a brief account of some of the outstanding geographical features of the country, various trips were described.

During the summer months the most conspicuous feature is the rice culture. The rice fields cover a very large part of the narrow valley and coastal plain and also of all the hills which can be terraced. Practically all of the rice of Japan is of the irrigated type and as the fields are small they are still cultivated by hand labor. The area of rice cultivation has been considerably extended in the last twenty years and it seems now as if almost all the available land has been utilized. Other summer crops are the lotus, Colocasia, various beans and the minor garden crops. Besides these, tea plantations are characteristic of certain parts of Japan, especially near Uji, not far from Kioto. The mulberry, grown for the silkworm industry is also seen in great quantity, and during the summer is largely stripped of its leaves, which have been removed for the food of the silk worms.

The bamboo, another plant associated with Japan, though largely introduced, has become fully established. The larger forms are almost all originally from other lands, at least that is the common statement. There are many introduced plants in the country, but the history of their introduction goes so far back and is so vague, and the plants themselves are so common, that they are now practically a part of the native flora. An example of the kind is probably *Cryptomeria japonica*, the most stately of the Japanese conifers.

Motoring out from Yokohama towards the foot hills of Fujisan, the road passes through a country characterized by small abrupt hills with narrow valleys between. It is well watered and there are many small rice fields, while the hills are covered with a mixed deciduous growth. As the sea shore is approached, the typical strand forms are to be seen, with the most conspicuous tree, *Pinus Thunbergii*, in either isolated specimens or in copses of some extent. The road is the old Tokaido and the pines which border it were planted many years ago. As the road ascends into the hills the country is more heavily wooded. These woods are naturally of a mixed growth, but owing to the extensive reforestation in the last two decades much of the forest is artificial.

A strongly marked characteristic of the natural Japanese forest is the great diversity of species found in the same area, due perhaps to the intermingling of forms from both the northern and the southern mainland. The most luxuriant forest growth is seen towards the north.

At the end of the talk a number of pictures were shown with the epidiascope. They were mainly taken from Professor Miyoshi's plates illustrating the flora of Japan, being supplemented by photographs and some of the old color prints of Hiroshige.

MARSHALL A. HOWE
Secretary.

MEETING OF APRIL 26, 1922

The meeting was held under the joint auspices of the Torrey Botanical Club, the New York Bird and Tree Club, and the Wild Flower Preservation Society of America. Some of the members of these organizations met at the Museum of the New York Botanical Garden at 11 A. M. and viewed birds, trees, and flowers on the Garden grounds under the guidance of Dr. G. Clyde Fisher, Dr. W. A. Murrill, and Mr. Percy Wilson. The meetings were held in the afternoon in the Mansion of the New York Botanical Garden, beginning at 2:30.

The first part of the program consisted of an illustrated lecture on "Woodland Wild Flowers" by Dr. Edgar T. Wherry of Washington, D. C.

The wild flowers found in woods may grow there because of favorable conditions of shade, climate or moisture, but the reaction of the soil is also an important factor. The leaves, twigs and bark of trees are often slightly acid in their living condition. When they fall to the ground, they are attacked by micro-organisms, some of which change the cellulose and other carbohydrates into acids, while others produce only carbon dioxide and water which escape leaving behind the alkaline ash constituents of the vegetable matter. Whether the forest litter in a given locality shall become acid or alkaline depends, accordingly, on which type of organism chances to predominate there. The mineral soil beneath may also have a modifying influence. The fixation of atmospheric nitrogen and the ren-

dering available of other plant foods in the soil is closely connected with the degree of acidity or of alkalinity represented. When the seeds of plants, in the course of their dispersal, reach a given locality, what will happen is largely determined by the chemical conditions. Only when the chemical character of the soil is exactly adapted to the needs of a given species will that species become well established.

By way of illustration a series of some 50 hand-colored lantern slides of wild flowers was shown, many of these slides being the property of the Washington Chapter of the Wild Flower Preservation Society of America.

The second item of the program was an illustrated talk by Dr. H. M. Denslow under the title "Our Terrestrial Orchids" assigned to him by the program committee.

Though orchids are almost gone from Greater New York, there are still to be found, within the sixty counties of the Torrey Club area, about fifty species, of twenty-two genera; these numbers being respectively about two-sevenths and four-sevenths of the totals recorded for North America. There is a great variety also, owing to the long reach, from Columbia County, N. Y., to Southern New Jersey, so that we have at one extreme *Limnorchis hyperborea* and at the other *Ophrys australis*. *Cypripedium arietinum* comes within about thirty miles of our limit, in New York and in Massachusetts, and *Blephariglottis peramoena* has been found until recently in New Jersey.

It was suggested that our species may be divided, with reference to their provision for the visits of insects, into the "pouch" species such as the Cypripediums, Peramiums and Calypso, and the "porch" species, which include the great majority of our species.

The fact was emphasized that most of our handsomest species are among the earliest; and the various kinds of root-formation were described briefly, to illustrate the hint of some connection between the luxuriant growth or early flowering of some species and their abundant provision for gathering and storing a readily available supply of nutriment for the season's growth.

About forty slides were shown, including some, furnished by Dr. Wherry, of species and stations near Washington, D. C.,

and one of *Ophrys australis* collected and photographed near Columbus, Miss., only a few days before.

The program concluded with an exhibition of lantern-slide photographs of our native orchids by Mr. Albert E. Lownes of Providence, R. I.

Marshall A. Howe
Secretary.

Meeting of May 9, 1922

This meeting was held at the American Museum of Natural History.

Four new members were elected:

Miss Mary Chambers, Brooklyn.

Miss L. O. Gaiser, Barnard College, N. Y. C.

Miss Alice Halsey, N. Y. C.

Miss Susanna Meyers, N. Y. C.

The secretary announced the death of Mrs. Alice R. Northrop. A committee was appointed to draw up suitable resolutions.

The scientific program consisted of an illustrated lecture by Dr. P. A. Rydberg on "Yellowstone National Park," dealing with floral and scenic features of that region.

Marshall A. Howe
Secretary.

NEWS NOTES

As a contribution to the discussion of evolution that has occupied so much space of recent months in newspapers, popular magazines, religious periodicals and the scientific publications, Dr. R. C. Benedict has published a leaflet on Evolution as Illustrated by Ferns, as No. 3, Series X, of the leaflets of the Brooklyn Botanic Gardens. Dr. Benedict describes the forms of the Boston fern developed in cultivation as an illustration of evolution of new forms that has occurred in the last few years.

A bill now before the House of Representatives would make the daisy our national flower. This is not the first flower to be suggested for such honor as the violet and mountain laurel have been nominated in bills recently. It hardly seems patriotic to suggest a plant not native of America for the purpose while the fact that the daisy is in places a troublesome weed would also be against it.

TORREYA

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AUSTRIAN FIELD CRESS: A NEW WEED IN THE UNITED STATES.

Albert A. Hansen

During June 1921, the attention of the writer was attracted to a weed that is over-running certain sections of Borderland Farm, New Milford, Orange County, New York. The plant grew in dense masses to the exclusion of practically all other vegetation.

At that time, the plant was in full bloom, and the tiny flowers gave the entire infested area a yellow cast. One field, which was used as a pasture, contained about five acres of infestation; patches of the weed occured at a distance of from two to three hundred yards from the main area of infestation, while the roadsides on the farm were thoroughly infested.

Since the plant was new to the writer, specimens were secured and identified. Indentification being impossible with American manuals, European works were consulted and the plant was identified as *Roripa austriaca*, Spach. (*Nasturtium austriacum* Crantz).

The identification was verified by the office of Economic and Systematic Botany of the United States Department of Agriculture. The common name of the plant is field cress or Austrian field cress. A picture of the field cress is contained in Reichenbach's "Icones Flora Germanica," figure 4295.

The following description of the species was translated from Boissier's Flora Orientales **11**:180 by Mr. S. F. Blake.

"Glabrous perennial; leaves oblong-spatulate, the lower petioled, entire or toothed, the others sessile, auriculate-cordate, denticulate; pods globose, much shorter than the erect-spreading pedicel; the valves nerveless; seeds scabrous under a lens." No entire-leaved specimens were found among the plants growing in New York.

A number of plants were dug and a study was made of the root system. The massed, bunched, above-ground growth is explained by the thick, fleshy, creeping roots, which extend in all directions and from which shoots arise at frequent intervals. The roots grow at a depth of from an inch to a foot or more. The matted, creeping, perennial root system suggests that the field cress is a potentially dangerous plant, since many of our worst weeds are difficult to eradicate on account of similar root systems. Examples of noxious weeds of this character are the Canada thistle and wild morning glory.

According to Mr. Lloyd Taylor, proprietor of Borderland Farm, the field cress was introduced upon his farm about 1910 by means of impure grass seed. At first the plant occured merely as a small patch which did not spread to any extent for a number of years. Care was exercised to mow the plant each season before seeds were formed, but the field cress spread gradually, evidently by means of the creeping roots. During recent years it has spread at an alarming rate until at the present time there is a total area of about seven acres of infestation, which is scattered over a considerably larger area on the farm. Borderland Farm is located on the boundary line between New York and New Jersey, consequently the infested area, though small, occurs in two states. The plant appears to have little preference as to soil, seeming to thrive equally well on wet or dry loam and on sandy soil, clay and gravel.

A Suggested Solution.

The Austrian field cress seems to be a new weed problem in the United States, since no report could be found of its occurrence as a weed in America. Futhermore, at present it is extremely limited in range, being apparently restricted to approximately six or seven acres of infestation occuring upon a single farm. In view of these facts there seems to be an excellent opportunity to extirpate a potentially dangerous weed at a comparatively small cost. One method by which this can be done is to station a man upon the infested area during the growing season for two years or more. It should be his sole duty to keep the green growth from developing, thereby starving the roots. It is possible to eradicate weeds possessing deep running roots or rootstocks by keeping the green tissue

cut back for an entire season, as has been demonstrated a number of times with the Canada thistle and other similar weeds.

One method by which it is thought that the field cress can be exterminated is by persistent spraying, either with an oil spray, a concentrated salt solution or an iron sulphate spray. The spraying should be continued until the plant is completely eradicated. Members of the mustard family are particularly susceptible to the effects of an iron sulphate or a copper sulphate spray. This method is now being used successfully in Maine, New Hampshire and other states for the control of wild mustard or field kale in grain crops. The same method has also been successful in destroying a number of other weeds of the mustard family. Since the Austrian field cress is a member of the mustard family, it is thought that the spraying method offers a reasonable chance for eradication. It is important that the work should be done without loss of time, since the longer the delay, the larger will be the area to be dealt with and the expense will be correspondingly greater. Agricultural authorities of New York, New Jersey and the federal government should be interested in this problem.

Numerous examples can be cited of foreign plants that first occurred in the United States in restricted areas, from which they gradually spread to become noxious weeds causing many thousands of dollars of damage annually. The king-devil, *Hieracium florentinum*, was first noted as a weed in a hay field at Cutler, Maine, occurring as a small patch a few feet in diameter. No precautions seem to have been taken to prevent its spread until at the present time it is an extremely troublesome weed from Quebec to New York. Thousands of acres of pasture land have been made unprofitable by this noxious plant.

Many newly introduced species seem to spread slowly at first. After a period of acclimatization, they seem to suddenly develop aggressive habits and become serious weed problems. A case at point is the wild turnip or rape (a member of the mustard family) which first appeared in the United States about 1863. The species did not prove troublesome until about 1887, when it began to spread rapidly. Since then it has become a noxious grain field weed in New York and throughout New England and Quebec. It is entirely possible that the Austrian field cress is now undergoing or has completed a similar period


A R Hansen.

of acclimatization that will be followed by a rapid spread. It seems to be the part of wisdom to attack the problem at present when it can be so readily disposed of.

Many additional and similar examples can readily be cited to prove that it is folly to allow a new plant with dangerous weed characteristics to spread without attempting eradication before it is too late. The Austrian field cress problem surely deserves the "ounce of prevention."

Radical measures are as necessary against a new weed problem of this character as are needed in dealing with insect and fungus pests. The cost of exterminating the Austrian field cress under present conditions should not be over five hundred dollars and it is believed that the investment will be a very wise one. The federal government has spent many thousands of dollars in attempts to eradicate such new agricultural pests as the corn borer and the Japanese beetle. The Austrian field cress problem now offers an opportunity to prevent possible great losses by the investment of a very modest sum. It is an opportunity that should not be neglected.

FIG. *1*. AUSTRIAN FIELD CRESS.
Roripa austriaca Spach.
Sketch made from specimens collected at New Milford, New York.

Contribution from the Botanical Department of the Purdue University Agricultural Experiment Station.

SOME OVERLOOKED SCROPHULARIACEAE OF RAFINESQUE

FRANCIS W. PENNELL

In preparing my reviews of the family Scrophulariaceae in the "Local Flora"* and in the Southeastern United States† the endeavor was made to include all species of this family ever described from these two areas. Once for all I wished to produce this history, so that the application of each name might be duly explained and the goodly proportion of excess names be honor-

* Torreya **19**: 107–119; 143–152; 161–171; 205–216; 235–242. 1919.
† Proc. Acad. Nat. Sci. Philadelphia **71**: 224–291. 1920.

ably laid away and forgotten. Consequently it is quite annoying to discover that from both regions a considerable number of names have been omitted. It seems necessary to make a brief historical supplement to be added jointly to my two papers.

The cause of the omission of these well-described species, all of Rafinesque, is that they were described in works so rare, at least in Europe, that they were not seen by the compilers of the Index Kewensis, that marvellous summary of plant-names. Of course, many other species and genera of Rafinesque have been overlooked beside these few Scrophulariaceae. The only large work of his not catalogued is the Autikon, and of the genera in it I am publishing a list in the Bulletin of the Torrey Club. The following Scrophulariaceae, excepting the last, are all from that work, and were published in 1840 under the serial numbers given, and on the pages whose numbers follow in parentheses. I quote Rafinesque's notes of occurrence, and add explanations and comments.

(1) AUTIKON BOTANIKON (1840)

319. Gratiola callosa Raf. (p. 42).

"Florida found by Baldwin." A synonym of the common species of the long-leaf pine-land, *G. ramosa* Walt., agreeing with the typical state in absence of bractlets beneath calyx.

320. Gratiola odorata Raf. (p. 43).

"*Virginica* L. O[mnes]. Easily known by the fine smell like Jessamine, all over N. Amer." A synonym of the wide-spread *G. neglecta* Torr., 1819, formerly by all ("omnes") called *G. virginiana*.

323. Gratiola heterophyla Raf. (p. 43).

"New Jersey to Florida." A small form of *G. neglecta* Torr., 1819.

325. Ambulia rigida (Raf.) Raf. (p. 43).

With his own *Gratiola rigida* (Atl. Jour. 176. 1833) from Arkansas or Texas, Rafinesque quite correctly identified the older *G. acuminata* Walt., 1788, and, because both possessing all four stamens fertile, he transferred them to the Oriental genus *Ambulia* Lam. The plant is *Mecardonia acuminata* (Walt.) Small. He now describes four varieties:

326. var. obovata Raf. (p. 43).

"Mts. Unaka," North Carolina. The largest inland mountain form.

327. var. microphyla Raf. (p. 43).

"Florida." Leaves smaller and pedicels shorter. Obviously the plant which I have called *Mecardonia acuminata brevifolia* (in Proc. Acad. Nat. Sci. Phila. **71**: 237. 1920), which thus becomes **M. acuminata microphylla** (Raf.) Pennell, comb. nov.

328. var. cuneata Raf. (p. 44).

"Carol [ina]. Alab [ama]." A form of the species.

329. var. angustifolia Raf. (p. 44).

"Florida." Leaves linear, oblong and pedicels long. A form of the species.

330. Ambulia micrantha (Nutt.) Raf. (p. 44).

"*Grat*[*iola*] do.[*micrantha*] Baldw......Florida, disc. by Baldwin." Baldwin's specimen was labeled "Gratiola micrantha," a name published by Nuttall in 1822. Rafinesque clearly described the same species, and his name with Nuttall's must pass into the synonymy of *Scoparia dulcis* L.

331. Ambulia? psilosa Raf. (p. 44).

"*Grat*[*iola*] 4gona El. his own specimens yet not answering to his description." Rafinesque redescribes Elliott's plant, noting such characteristic features as the obovate or oblong (rather than "lanceolate") leaves and the slightly oblique capsule. With Elliott's *Gratiola tetragona* 1816, this becomes a synonym of *Ilysanthes dubia* (L.) Barnhart.

332. Macuillamia rotundifolia (Michx.) Raf. (p. 44).

"*Monniera*, and *Herpestis* do. auct.......Illinois. . . . This G[enus] was established by me in Neogen. 16, year 1825." This earlier publication was not typifiable, no species being cited. But now three are given, the first, by adapted description and also mention Illinois, definitely based upon *Monniera rotundifolia* Michx., 1803, from that state. In the Proc. Acad. Nat. Sci. Phila. **71**:242. 1920. I have used a later generic name *Ranapalus* Kellogg, 1877, for the group to which this species pertains. This must lapse into synonymy, and *R. rotundifolius* (Michx.) Pennell give place to *Macuillamia rotundifolia* (Michx.) Raf.

333. Macuillamia obovata Raf. (p. 44).

"Virginia in the River Potomac and in Louisiana." Said to be larger than the preceding, to have leaves obovate or elliptic, sessile, and pedicels shorter than the leaves. Evidently a needed redescription of *M. rotundifolia* (Michx.), and based upon actual

material seen. The former locality sustains the label "Va." on an old specimen in the herbarium of Columbia University, and the plant should be sought in the Potomac Valley.

334. Macuillamia amplexicaulis (Michx.) Raf. (p. 44).
"Mon. . . . do auct. [= *Monniera amplexicaulis* Michx.] Carol[ina] Florida." This name must be added to the synonymy of *Hydrotrida caroliniana* (Walt.) Small.

336. Bazina nudiflora Raf., gen. (p. 44) and sp. (p. 45) nov.
"*Lindernia grandifl*[*ora*] Nut[t]. . . . Florida." Certainly this plant and so a synonym of *Ilysanthes grandiflora* (Nutt.) Benth. Rafinesque's specimen had the leaves "crowded," hence it was possible for him to err in supposing them subalternate. The pedicels are alternate.

338. Ilysanthes brevipes Raf. (p. 45).
"Allegh[any] Mts. of New Jersey and Pennsylv[ania]." Described as with leaves oblong, pedicels shorter than the leaves and flowers "white." Certainly the plant is *I. dubia* (L.) Barnhart, the flowers of which are frequently pale.

339. Ilysanthes geniculata Raf. (p. 45).
"Long Island and South New Jersey." Described as with leaves ovate, pedicels equaling the leaves, and flowers "incarnate." Occasional flowers of this genus may be pinkish, or even incarnate. Apparently the plant is *I. inaequalis* (Walt.) Pennell, although in that species the capsules are usually longer, not shorter than the calyx.

341. Ilysanthes refracta (Ell.) Raf. (p. 46).
This publication antedates *I. refracta* (Ell.) Benth., 1846.

342. Ilysanthes dilatata (Muhl.) Raf. (p. 46).
Based upon *Lindernia dilatata* Muhl., 1816. The name therefore passes into the synonymy of *I. inaequalis* (Walt.) Pennell.

343. Ilysanthes anagallidea (Michx.) Raf. (p. 46).
This publication much antedates *I. anagallidea* (Michx.) Robinson, 1908. This also is a synonym of *I. inaequalis* (Walt.) Pennell.

344. "Hemianthus micranthus" (p. 46).
Credited to Nuttall, and apparently an error for *H. micranthemoides* Nutt., 1817. It is unfortunate that the combination was not intentionally made, as it would have long antedated

my making of the transfer, *H. micranthus* (Pursh.) in Torreya **19**:150. 1919.

1139. Antirrhinum canadense assurgens Raf. (p. 155).

"South New Jersey, Virg[inia]." A large-flowered form of *Linaria canadensis* (L.) Dum. -Cours.

1160. Tursitis filifera Raf. (p. 157).

"Louisiana, Alab[ama]." Evidently a form of *Kickxia Elatine* (L.) Dumort. *Tursitis Elatine* (L.) Raf., (p. 156), an introduced Palaearctic species.

1174. Melampyrum lanceolatum Raf. (p. 160).

"Mts. Alleghany, New Jersey to Kentucky." This is *M. lineare latifolium* (Muhl.) Beauverd.

1180. Scrophularia pectinata Raf. (p. 160).

"New Jersey and Long Island." The description of leaves ovate-lanceolate, acute at both ends, pectinately serrate or sinuately laciniate, apparently must apply to the species which we have known as *S. leporella* Bickn. It is unfortunate to replace the well-chosen name given by Mr. Bicknell in his classic study of our eastern Scrophularias (in Bull. Torrey Club **23**:314–319. 1896), but his own action on page 315 therein, giving preference to the vaguely described *S. occidentalis* (Rydb.) would have made it impossible to retain the same. Before Mr. Bicknell's paper, no one had fully understood our species of figwort, and that Rafinesque did not is shown by his recognizing *seven* eastern species, based mainly upon leaf-outline, angling of stem, and differences of flower-color. All his species reduce to Mr. Bicknell's two: (A) *leporella*, the plant of early summer, with leaves more sharply cut, narrowed or at least never cordate at base, the inflorescence longer and narrower, of a series of evident fascicles, the corolla more yellow, and the sterile filament yellow; and (B) *marylandica*, the plant of late summer, with leaves less cut, tending to cordate at base, the inflorescence more ample and lax, not so obviously in fascicles, the corolla browner, and the sterile filament purple-brown.

However, there is a still earlier name which needs reconsideration. Pursh (Fl. Am. Sept. 419. 1814), claimed to know living two species of *Scrophularia* in Pennsylvania. His contrast states: (a) *S. lanceolata*, with leaves lanceolate, unequally serrate, acuminate, at base acute, petioles bare, fascicles of the panicle corymbose: flowers greenish-yellow; "Aug. Sept."; and (b)

S. marylandica, with leaves cordate, serrate, acute, at base rounded, petioles ciliate below, fascicles of panicle laxly few-flowered; flowers greenish-brown; "June-Aug." Comparing both these descriptions with the brief summaries above, it is clear that leaf-form and serration, inflorescence and flower-color would indicate that (a) *lanceolata* is (A) *leporella*, and (b) is (B) *marylandica*. But the statements of flowering-season seem to indicate the reverse!

Granted that occasional variants of each species could approach the characterization of the opposite species in individual features, would not the assumption that Pursh had in both instances described such abnormal plants, and had from each drawn up a description actually more characteristic of its opponent species, be improbable or impossible? Much more likely he has, either on his labels or in the passage of his book through the press, simply transferred his data of season from species to species. That Pursh had present *leporella* is proven by his statement of months, for "June-Aug." is impossible for *marylandica*, while his description of his "early" plant with leaves cordate, etc., forces us to seek his *leporella* description under his other species, and to *lanceolata* it fits well!

Mr. Bicknell has argued that Pursh's *Scrophularia lanceolata* is applicable to some narrow-leaved form of *S. marilandica* L. But this would not remove the difficulty that the contrasting description is not of *leporella*, and under one caption or the other that plant must be accounted for. I regret that all efforts to discover Pursh's types have failed; they are not at the Philadelphia Academy of Natural Sciences, the British Museum, nor the University of Oxford.

To summarize, I adopt for our early summer figwort the name *Scrophularia lanceolata* Pursh, 1814, placing in its synonomy *S. pectinata*. Raf., 1840, and *S. leporella* Bickn. 1896; and as a variety I establish **S. lanceolata occidentalis** (Rydb.) Pennell, comb. nov. (*S. nodosa occidentalis* Rydb. Contrib. U. S. Nat. Herb. 3:517. 1896).

1181. Scrophularia lanceolata Pursh (p. 160).

"New York to Virg[inia]." Supposed to be distinguished from *S. pectinata* Raf., by its stem acutely, not obtusely angled, and its leaves lanceolate, unequally and doubly serrate. These are variable characters in this species. Rafinesque appears to have correctly applied this name. See discussion above.

1182. Scrophularia marilandica L. (or glauca Raf.) (p. 160).

"Canada to Carol[ina] differs from *pectinata* by leaves ovate or subcordate glaucous beneath, simply serrate petiols ciliolate, fl. paniculate purplish. . . ." Evidently is *S. marilandica* L., as now understood. See discussion above.

1186. Scrophularia dimidiata Raf. (p. 161).

"Carol[ina]. Florida." From description of leaves incisely serrate, and panicles remotely racemose, this may have been *S. lanceolata* Pursh. If so, the Florida record would be erroneous.

(2) AMERICAN MONTHLY MAGAZINE (vol. 3. 1818)

Limosella brachistema Raf., (p. 273).

"Dr. Ives of New Haven had discovered it [as well as had Mr. Nuttall]. . . The figure given by Dr. Ives in the Transactions of the Physico Medical Society of New York is adequate to prove [it not *L. tenuifolia* of Europe]" Apparently based especially upon this plate and description of Ives, overlooking the fact that the latter had published the name *L. subulata* Ives (in Trans. Phys. Med. Soc. N. Y. **1**:440. 1817.) A synonym of *L. sublata* Ives.

(3) SYNOPSIS OF ABOVE NAMES

This list gives the species recognized or to the synonomy of which Rafinesquian names are added. Numbers refer to the order in Autikon Botanikon.

GRATIOLA NEGLECTA Torr.
  G. heterophyla Raf. 323.
  G. odorata Raf. 320.

GRATIOLA RAMOSA Walt.
  G. callosa Raf. 319.

HYDROTRIDA CAROLINIANA (Walt.) Small.
  Macuillamia amplexicaulis (Michx.) Raf. 334.

ILYSANTHES DUBIA (L.) Barnh.
  Ambulia psilosa Raf. 331.
  Ilysanthes brevipes Raf. 338.

ILYSANTHES GRANDIFLORA (Nutt.) Benth.
  Bazina nudiflora Raf. 336.

ILYSANTHES INAEQUALIS (Walt.) Pennell.
  I. anagallidea (Michx.) Raf. 343.
  I. dilatata (Muhl.) Raf. 342.
  I. geniculata Raf. 339.

Ilysanthes refracta (Ell.) Raf. 341.

Kickxia Elatine (L.) Dumort.

Tursitis Elatine (L.) Raf. 1159.

T. filifera Raf. 1160.

Limosella subulata Ives.

L. brachistema Raf. [end of list above].

Linaria canadensis (L.) Dum.-Cours.

Antirrhinum canadense assurgens Raf. 1139.

Macuillamia rotundifolia (Michx.) Raf. 332.

M. obovata Raf. 333.

Mecardonia acuminata (Walt.) Small.

Ambulia rigida (Raf.) Raf. 325.

Melampyrum lineare latifolium (Muhl.) Beauverd.

M. lanceolatum Raf. 1174.

Scoparia dulcis L.

Ambulia micrantha (Nutt.) Raf. 330.

Scrophularia lanceolata Pursh.

(?) *S. dimidiata* Raf. 1186.

S. leporella Bickn.

S. pectinata Raf. 1180.

Academy of Natural Sciences, Philadelphia.

SHORTER NOTES

NOTES ON A GROWTH OF YOUNG WHITE BIRCH.

Herbert C. Wickenheiser.

There is an interesting stand of very young white birch on the cinder filled swamp area at the south end of Van Cortlandt Park, facing Broadway, New York City. These trees appear to be in the main exceptionally well-formed, typical specimens of the common white birch, *Betula populifolia*, having even in this young stage the characteristic pyramidal form. They all seem vigorous and well rooted and are growing nicely. Their distribution over the filled-in swamp area is rather irregular, in some places none and in others covering the ground as uniformly as in a cultivated plot.

The material on which they grow can scarcely be spoken of as soil. It is very dry, fairly hard and compact, composed of mixed coarse and fine cinders, clinkers, ashes and charcoal with a little clayey soil in a few places.

The trees grow most plentifully on the higher and drier parts, there being few or none in the occasional shallow depressions where there is more soil and some stagnant water. These low areas are occupied by grasses, weeds and young willows. A broad, shallow stream of polluted water meanders across the field. The birches stand well back from this stream.

Some reasonably precise measurements gave the following results:—

The average height of the trees is twenty-four and a half inches. The tallest was forty inches and the smallest was four inches. The average thickness of the stems six inches above the ground was a little over one fourth of an inch. On several plots fifty feet square the number of trees averaged thirty-five. The total number of young birches over the entire field of about ten acres is about one thousand.

The tallest trees in the stand are five years old, which means that the earliest seeds took root on the plot the same season the filling in of the swamp was completed.

Interspersed irregularly among the birches are numerous small willows averaging twenty-seven inches in height. There are also many small locusts, some small-toothed aspens, poplars, bay-berry, etc., all very young growth. There is much clover, particularly in the hollows, and a great variety of weeds and a few typical marsh grasses.

No white birch trees grow anywhere in sight of this field but a small group of mature trees was found about half a mile to the north. There were about thirty-five of these trees, all well formed, healthy specimens about twenty feet in height. These trees might easily have supplied the seeds which gave rise to the young growth to the south as there is practically no obstruction between them.

Another more scattered stand of older white birches was found still farther to the north and west in Van Cortlandt Park. These trees are more numerous and larger than those already noted. They are growing on the north and north-west sides of a long wooded knoll interspersed with stalwart oaks, tall beeches, scrawny sumach and a few elms and maples. Their white

bark stands out in pleasing contrast with the darker hued trunks about them. Many of them are exceptionally well formed with full foliage. Their delicacy of forms calls to mind Lowell's admirable tribute:

"Their shadow scarce seems shade, their pattering leaflets
Sprinkle their gathered sunshine o'er my senses
And Nature gives me all her summer confidences."

New York City

A NEW WEED FROM OREGON

James C. Nelson

In the summer of 1920, Mr. William L. Teutsch, County Agricultural Agent for Lake County, Oregon, sent to the herbarium of the Oregon Agricultural College at Corvallis, specimens of a weed which had been found growing in great profusion in a field of alfalfa on the Lerwick ranch, three quarters of a mile north of Lakeview. Dr. Helen M. Gilkey, Curator of the College herbarium, kindly distributed some of these specimens among the other Oregon botanists. The plant was evidently a labiate, and a consultation of Bentham & Hooker's Genera Plantarum seemed to place it in *Salvia*; but it was beyond our powers to determine it among the six hundred and more species of that vast genus. We accordingly appealed to the Gray and National Herbaria, and our plant was identified at both of these institutions as *Salvia Aethiopis* L., sometimes known as "African sage," a species previously unknown in Oregon.

Mr. Teutsch writes that the plant was not only very abundant in the heavy loam of the alfalfa-field, where it was actually choking out some of the alfalfa plants, but that it had spread to the adjoining (presumably unirrigated) hillside, and was growing in great profusion on a shallow basaltic soil, "indicating that it was a hardy plant and could withstand great drought," the semi-arid climate of Lake County permitting agricultural operations only with the aid of irrigation. It has continued at the same station until the present year (1922); is very prolific and is spreading rapidly. Mr. Teutsch is of the opinion that it may easily become a very noxious weed, though it has not yet appeared at any other station*. It is a tall coarse plant,

* Since writing this it has been found by Prof. M. E. Peck, at Gossil, Wheeler Co., about 200 miles north of the Lake Co. station

with inconspicuous flowers, densely covered with a shaggy ashy pubescence, in general aspect resembling a thistle more than any of the better-known species of sage.

Linnaeus first described this species in Sp. Pl. 27. 1753, and gives the range as "Illyria, Graecia, Africa." The specific name seems not to have had any reference to the geographical distribution, but to have expressed Linnaeus' belief that this plant is the one referred to by various ancient authors under the name of "Aethiopis." Perhaps the best-known passage is one in Pliny (Nat. Hist. 27:4, 3), which may be roughly translated as follows:

"Aethiopis has many large leaves like those of mullein, and is hirsute from the base. The stem is square, rough, like *arcion* [perhaps a mullein], hollow and many-jointed; the seed is like the bitter vetch (*ervum*), white and paired; the roots are numerous, long, fleshy, soft, and sticky to the taste. The plant turns black when dried and hardens, so that it resembles horn. It grows in Ethiopia, the Trojan Mount Ida, and in Messenia. It is gathered in the autumn and dried for several days in the sun to prevent mould (*situm*). A decoction in vinegar is efficacious in diseases of women, for sciatica, pleurisy and hoarseness. That which comes from Ethiopia is the best, and it is used there as a medicine."

The resemblance to mullein seems to have impressed other writers also—or to have been copied freely. Dioscorides (**4**: 104) says that "Aethiopis has leaves like mullein, hairy and thick"; and Paulus Aegineta, writing several centuries later, repeats (**7**: 3) the "leaves like mullein," and adds: "A decoction of the root is used for sciatica, pleurisy, and spitting blood, and, mixed with honey, for hoarseness." This latter property, suggesting the familiar horehound, or the "sage tea" of our grandmothers, seems to indicate a labiate plant. Whether *Salvia Aethiopis* is really the "Aethiopis" of the ancients can perhaps never be fully demonstrated; but some at least of the commentators and lexicographers have followed Linnaeus in that belief.

It may be of interest to add that another weed of this genus was collected as a grain-field weed in Umatilla County, Oregon by Professor M. E. Peck in the summer of 1921, and was determined by Mr. Bayard Long as *S. sylvestris* L. —a smaller and

less vigorous plant, with more showy flowers. These Mediterranean weeds seem to be finding a very congenial home in Oregon.

Mr. Teutsch writes that the "African sage" was growing with what is known as "Cossack" alfalfa, and suggests that it may have been introduced with the alfalfa seed, "which was originally imported from northern Russia." The word Cossack would seem however to indicate a more southern origin, and the Salvia could probably be expected in the vicinity of the Black Sea.

I am indebted to Mr. Teutsch and Dr. Gilkey for specimens and local data, and to Dr. A. S. Pease for the Greek quotations rreferring to "Aethiopis." Miss Mary A. Day has kindly verified the citation of original publication.

Salem, Oregon

REVIEWS

Trelease, Plant Materials.*

This is a second edition of the guide to the cultivated woody plants of the eastern United States, made more valuable by page references in the keys. The book starts with four keys to the trees, shrubs, undershrubs and climbers based on leaf and twig characters. Many of the plants may be found in two or more of the keys. From the keys one is carried to the descriptions of genera on the following pages where other keys refer to all species found commonly in cultivation as well as to many of the native ones not often cultivated. Descriptions of the species of course are not possible in a book meant to be carried easily in the pocket. As in the first edition, 1150 species and forms belonging to 247 genera are referred to. This little book should be of great value to those familiar enough with botanical terms to use keys which are easy and accurate. A glossary is given by which the non-botanical may follow through the keys, though we fear they will find it a difficult proceeding.

G. T. H.

*Trelease, William, Plant Materials of Decorative Gardening. The Woody Plants. Pp xliii + 177. 1921. Urbana, Ill. $1.00.

NEWS ITEMS

A copy of the 4th Annual Report of the Official Seed Testing Station for England and Wales has recently been received. The Station, a part of the National Institute of Agricultural Botany, moved into new buildings at Cambridge, England, in the fall of 1921. According to the report the station tested during the year 1920-21 nearly 24,000 samples of seed both for purity and for germination. Seeds tested were of many kinds, clover, wheat, mangolds (field beets), barley, peas, and rye grass leading in the number of samples. Over 2,500 samples of oats were tested, 1,900 of wheat and 14 of maize! Most of the seeds tested were sent by dealers, only seven percent coming from farmers. Such work should be of great value and help in the making of definite standards for seeds.

In our January–February issue we spoke of the effort of the government to eradicate "Flanders Poppies" which had been found on ballast in N. J. In connection with the celebration of Memorial Day by the wearing of poppies, suggestions have appeared in the daily press in many parts of the country that the poppies be planted as in commemoration of the world war. When such plans are considered it is well to remember the results of introducing the English sparrow, the starling, the water hyacinth, and other species of supposed value.

Mr. John M. Fogg, Jr., now at the Philadelphia Academy of Natural Sciences, will on September first take charge of the Herbarium of the University of Pennsylvania.

TORREYA

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SONCHUS ULIGINOSUS OCCURRING IN THE PHILADELPHIA AREA

By Bayard Long

In the autumn of 1917, an unfamiliar *Sonchus* was detected along a railroad embankment near Allentown, Pennsylvania, by Mr. Harold W. Pretz, in the intensive exploration of Lehigh County which he has been carrying on for some years. A specimen was sent to the Philadelphia Academy with his annual contribution of material. The plant was far advanced into maturity, with only a few fresh heads and no achenes, but it was easily seen to be a form not commonly recognized in our flora. It was evidently not closely allied to our two common annual species of Sow Thistles, *S. asper* and *S. oleraceus*, but from its foliage and several inches of stout root, increasing in diameter to the broken end, it at once suggested a relationship with the perennial *S. arvensis*—from which, however, it appeared to differ in several points, the most striking of which was its glabrous involucres and pedicels. In 1918 another station was discovered, and with each succeeding year additional material of the plant has been coming to hand from new stations in our local area. During the season of 1921 there was a greater number of collections made, from areas more widely separated, than in any previous year—in fact almost as many as from 1917 to 1920.

We have learned, therefore, of a sufficient number of stations to show its presence in several counties of two states, and have enough intimate data on its occurrence to be reasonably certain of its actual status in our flora— particularly that it is not a mere casual appearing only in grass- or grain-fields (as so many of our new introductions). There is adequate information accumulated, it is believed, to indicate that this new weed is becoming exceptionally well established and promising to be a conspicuous and permanent element in our introduced flora.

In the course of identifying this plant and making comparisons with other material, it became obvious that we had to do with a close ally of *S. arvensis* var. *glabrescens*, which had been recorded some years previously in America by Fernald and Wiegand.* It seemed that this form should be merely a glabrous extreme of *S. arvensis*, differing only in the lack of glandularity on the pedicels and involucral bracts—as correctly interpreted by the critical judgment of these authors. The plant of immediate concern introduced in the Philadelphia area differed from a glabrous phase of *S. arvensis* in the larger inflorescence of more numerous heads, the narrower and more cylindric involucres, the shorter and paler bracts, the (apparently) larger heads. This plant matches well material of a species allied to *S. arvensis* from the region about the Caspian Sea—*Sonchus uliginosus* Bieb. Some European students, it may be noted, have reduced Bieberstein's species to *S. arvensis* var. *glabrescens* Günth., Grab. & Wimm.† but, although there may be some doubt as to the specific distinctness of *S. uliginosus*, it does not appear to be the same as the plant of Günther, Grabowski and Wimmer.‡

Of the half-dozen collectors who have met the plant all have furnished intimate accounts of the stations known to them. Mr. Pretz has been the most fortunate in seeing it many times.

* Fernald & Wiegand, Rhodora, xii. 145 (1910).

† Mr. S. F. Blake has called my attention to the fact that the name *Sonchus arvensis* var *glabrescens* was first published by C. Günther, H. Grabowski, and F. Wimmer, Enum. Stirp. Phan. Siles. p. 127. 1824. It is described as "*Sonchus arvensis* . . . *B. glabrescens* nob. pedunculis calycibusque glabris. Bei Reinerz (Wiemann). Bei Einseidel in Gesenke. Aug. ♃." This is a rare volume.

‡ Through the kind interest of Mr. C. A. Weatherby I have been enabled to examine the bases of the records for *S. arvensis* var. *glabrescens* by Fernald and Wiegand, as well as certain later collections similarly referred. Of these specimens at least two certainly appear to be the same as the plant here identified with *S. uliginosus*: Dry roadside back of Sibley College, Cornell University Campus, Ithaca, Tompkins County, New York, July 26, 1916, K. M. Wiegand 7327; Near Soldiers Home, Erie County, Ohio, August 1902, W. P. Holt. In view of our imperfect understanding of the relation of *S. uliginosus* to *S. arvensis* var. *glabrescens*, this determinative comment is advanced with considerable hesitancy and should be considered as only tentative or suggestive for consideration by some student of the Cichoriaceae.

He has kept detailed field-notes on the various occurrences, and through his kindness I have been privileged to draw freely from them.

The first collection of the plant was made along the Philadelphia and Reading Railway adjacent to Allentown, September 22, 1917. In the hope of getting better material the spot was visited the following year, but the station had been destroyed in the laying of additional tracks. Although this station had been lost another was discovered July 28, 1918 in Lehigh County near Emaus. There was a small colony of possibly one or two dozen plants growing close to a hedgerow, paralleling the public road and trolley-line. It occurred in rough ground largely of cinder and slag talus from the adjacent dump of the Donaldson Iron Company. The plants were already showing some clusters of mature heads, with the pappus blowing away, while others were in handsome full-bloom.

Several times, while passing rapidly, a guest on automobile rides, Mr. Pretz had made note of a conspicuous yellow-flowered plant along Walbert's Pike not far out of Allentown, but not until August 1, 1919, did opportunity occur to collect this plant and prove it to represent another station for the new *Sonchus*. It had become abundantly established on a grassy strip between the road and a cultivated field. A similar-appearing plant had also been noticed from an automobile near Dorneyville crossroads (Lehigh County) and a trip was made August 9, 1919 by Mr. Pretz for the collection of the plant. It was here found established at several places along the fence-rows on both sides of the road, and was also very abundant in an abandoned field nearby. The plants in the old field were especially vigorous and well developed, specimens over five feet high being collected. This same year, still another new station was detected: about two and a half miles west of Centre Square, Allentown. August 14, 1919 material was collected here from a fair abundance of the plant along a fence-row between road and field. A half-mile or more north of this station occurs what appears to be, observed from the passing trolley-car, another colony of the species.

In 1920, Mr. Pretz made two new collections and more observations in Lehigh County. August 15 a colony of the plant was found some two miles from Wescoesville P. O., es-

tablished on a roadside embankment adjacent to open scrub-growth by the fence-line. This colony also showed vigorous plants over five feet high. Toward the village and within about a mile of it another colony of apparently the same species was noted in conspicuous bloom in a field close to the road, but there was not opportunity for examination nor for the obtaining of material. Later in the season, September 19, and on the other side of the village still another collection was made from a fair abundance of the plant scattered over a grassy-weedy field, unplowed, and apparently mowed for hay. In adjacent fields, and a quarter-mile or more out from the village, plants from several more colonies were examined and verified as the new introduction.

The most recent collection made by Mr. Pretz was on August 14, 1921, near Walbert's, a station on the Catasauqua & Fogelsville Branch of the Philadelphia & Reading Railway. The plant here grew abundantly about the edges of a cultivated corn-field, close to the fences.

Additional information on the plant about Allentown is furnished by a collection made by Mr. Walter Benner, July 21, 1920, on a lot near 27th and Liberty Streets. This is a section of the city where there are few buildings but a considerable tract is laid out in building lots, and some are used as truck-patches. A year or two previously this particular lot apparently had been under cultivation, but was now grown up with *Lactuca Scariola* and numerous other weeds—among which *Sonchus uliginosus* had made a rather dense growth.

These stations in Lehigh County lie in a fairly circumscribed area- within about a five-mile westerly and southerly radius of Allentown.

Mr. Benner had become familiar with the plant near Allentown and during the following summer, in his vigorous collecting in Bucks County (the area in which he specializes), he detected it near Pleasant Valley, August 15, 1921, growing in a cultivated field which was then in grass but previously had been in grain. The plants were scattered over one end of the field, standing up conspicuously above the low grass. This locality is ten miles east of the nearest previously known station, Emaus.

In the course of naming various specimens for Rev. and Mrs. S. W. Creasey, who are interested in the nature work of the

Scout movement, another locality was disclosed. Through their interest it was learned that the specimen came from near Quakertown, Bucks County, Pennsylvania, having been communicated by Miss Mary H. Williams during the autumn of 1921. Two or three clumps had appeared spontaneously, some time previously, along a driveway at Cellison's Mill and because of the attractive flowers had been allowed to remain there rather than eradicated as an undesirable weed. This station is some half-dozen miles in a general southerly direction from Emaus and Pleasant Valley.

After having seen the material of *S. uliginosus* augmenting year by year, it was gratifying to discover a station myself in a new area. During the recent war years "ballast-grounds" were born anew about some of our seaports and it was possible for a later generation to experience some of the thrills, and acquire some of the enthusiasm, which the botanists of the 60's and 70's of the last century had in exploring these bits of foreign territory transplanted to our shores. It was indeed a novel and, not to be denied, fascinating experience to pass in a few moments from the streets of Philadelphia to what might readily have been some European seaport. Among scores of foreign species, which few botanists of the present generation have been so fortunate as to see growing wild in America, on one of my visits to the ballast-grounds at the foot of Wolf Street, along the Delaware River, June 27, 1921, was a *Sonchus* in its first bloom. There was a single, closely compacted colony about a foot and a half high. The knowledge that *S. arvensis* was one of the regular denizens of the ballast-grounds of the old days almost allowed me to greet the plant as an old friend among the host of strangers. But its glabrous pedicels and involucral bracts, on second examination, corrected this impression. With this occurrence in Philadelphia an extension was made of about forty miles south of Quakertown.

In recent years our knowledge of the plants of Delaware has been annually increased by Rev. J. P. Otis, and during 1921 one of his interesting discoveries was a colony of *S. uliginosus*. September 19, 1921, as he was crossing certain open ground along the Lincoln Highway near Marshallton, he was attracted by the large yellow heads of the unfamiliar species. There were some half-dozen plants growing near together (but not

forming a clump) in a dry and barren field. Evidently they were affected by the sterile soil as Mr. Otis' specimens show plants only one to two feet high. With the extension into Delaware a stretch of nearly thirty miles to the southwest of Philadelphia is added to the plant's distribution.

While the notes on this matter were in drafting there appeared in an issue of the *Journal of the New York Botanical Garden*,* under the list of accessions to the herbarium, the item "1 specimen of *Sonchus uliginosus* from Pennsylvania (Given by Mr. E. A. Rau.)" and shortly thereafter came a brief note by Dr. John K. Small in *Torreya*† amplifying this to a statement that the species, here first reported for America, was established in fields near Hecktown in Northampton County, where Mr. Rau had collected material July 21, 1921. Of this locality certain more detailed information has been furnished by Mr. Rau. The plant was found in a grain-field about a mile west of Hecktown and brought to his attention by an acquaintance interested in its identity. A large colony of it was observed. From local accounts the same species was believed to occur in other nearby fields. Hecktown is ten miles to the northeast of Allentown.

The above does not represent by any means the entirety of the field observations on the occurrence of the plant in the Philadelphia area. It is often so tall and so conspicuous when in bloom, especially in the morning when the heads are expanded, that it may readily be detected from the railroad-train, trolley-car, or automobile. Mr. Pretz has numerous notes of such probable occurrences in Lehigh County which need only closer observation or collection to be substantiated. There are also several reports from other local areas, of which specimen vouchers have not yet been obtained.

These stations lie in the counties of Northampton, Lehigh, Bucks, and Philadelphia of southeastern Pennsylvania and in Newcastle County of northern Delaware. The northernmost is Hecktown and the most southerly, Marshallton, They all lie within a rectangle about seventy miles north and south by thirty miles east and west; the meridian of Hecktown is in the median line. Its center of frequence would appear to be in Lehigh

* Journ. N. Y. Bot. Gard. xxii. 192 (1922).

† Small, Torreya, xxi. 100 (1922).

County, unless our knowledge of more stations there than elsewhere is due to the very acute observations of Mr. Pretz and his vigorous collecting. However, it can be asserted with confidence that no botanist in the Philadelphia area (where *S. arvensis* is a rare species) could possibly overlook a plant with such large and bright yellow heads. Its handsome bloom or the striking display of color when in quantity have invariably attracted its collectors.

From its occurrence in some cases in cultivated fields it is quite generally supposed to have been introduced with foreign seed. Its native region appears to be extreme eastern Europe and adjacent Asia—in general, the area between the Caucasus, Ural, and Altai regions. Mr. Pretz has communicated with the Office of Seed and Plant Introduction of the United States Department of Agriculture regarding the possible importation of seed from this Old World area for sale or introduction. It was learned, through Mr. S. F. Blake, that a good deal of Alfalfa seed has been imported from the Caucasus region in recent years.* *S. uliginosus* has been found with Alfalfa in some places, but Red Clover, Alsike, and various other plants of cultivation have also been noted as associates, Mr. Pretz informs me, so that its occurrence with Alfalfa has not been sufficiently marked or distinctive to make it obvious that this has been the carrier.

Except in the Allentown region, the stations are certainly so scattered and far apart that it would seem they can scarcely represent dissemination from a single station—as by natural seeding. The immediate sources of most of these stations, if not quite independent, might well be related to some large grain or seed importation, rather well distributed, which contained the weed seeds of the *Sonchus*. Introduction with imported seed seems a reasonable surmise but it must be confessed that this somewhat general belief is substantiated in most cases by little or no detailed evidence. Regarding the origin of the station near Quakertown, an acceptable view is advanced by Rev. Creasey. The plant occurs beside a grist-mill, which fact is certainly significant. But this in turn leads us to ask where was grown the grain with which the weed seeds came to the mill, and whence did the farmer originally obtain his seed-grain?

* Blake, Science, lv. 455 (1922).

Although it is not clearly demonstrated how the species arrived in this country, nor how most of the stations have originated, it is obvious that already the plant has thoroughly established itself, not only on the borders of cultivated fields and areas adjacent thereto, but along roadsides, in uncultivated lands, and waste places.* The long horizontal roots, perennial and often deep seated, suggest the possibility that in this plant we may well find a rival to the Canada Thistle in persistence.

Academy of Natural Sciences of Philadelphia.

ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1921.

By James C. Nelson

A few more species remain to be added to the flora of the Willamette Valley as the result of the past season's collecting. Our list of local species appears to approach completion very much as certain geometric curves approacn a straight line—always coming nearer, but never reaching absolute contact this side of infinity. Let it be again remarked, as in previous lists, that all of these species were growing without cultivation, and seem in all cases to be permanent members of our flora.

The total number of Oregon species that have been reported as not mentioned in Piper and Beattie's Flora of the Northwest Coast has now reached 371. Adding these to the 1617 species of that manual, we are now within 12 species of the 2000 predicted earlier in this series. Another season should complete this total.

Introduced species are marked*.

1. *Equisetum hyemale* L. var. *californicum* Milde. Not infrequent along streams in sandy woods. Determined by W. R. Maxon.

2. *Equisetum palustre* L. Very common in the low ground north of Chemawa, Marion Co., but rarely fruiting. This was

* The recent report by O. A. Stevens in the *Bulletin of the Torrey Botanical Club* for April 1922 of its frequence in the Red River Valley of North Dakota, Minnesota, and adjoining Canada is indicative of its already wide dispersal in America.

at first taken for *E. litorale* Kiihl., but was determined by W. R. Maxon.†

3. *Selaginella Wallacei* Hieron. On dry rocky cliffs on Spencer's Butte, Lane Co., and at Oswego Lake in Clackamas Co. Determined by W. R. Maxon. This is doubtless the "*S. rupestris* (L.) Spring." of the Flora of the Northwest Coast—a species which does not occur in our range.

4. *Isoetes Howellii* Engelm. A large colony on the bottom of a pond along the Southern Pacific tracks three miles southeast of Salem. Determined by Norma E. Pfeiffer.

5. *Echinochloa muricata* (Michx.) Fernald var. *occidentalis* Wiegand. On the sandy shore of the Columbia River on Hayden Island, opposite Vancouver, Wash. Determined by K. M. Wiegand.

6. **Notholcus mollis* (L.) Hitchc. On a rubbish-heap in the rear of a saw-mill on the bank of the North Santiam River at Stayton, Marion Co. Recently reported from California. Determined by Agnes Chase.

7. *Carex Tracyi* Mackenzie. Not infrequent in low meadows about Salem. This is the "*C. leporina* L." of the Fl. N. W. Coast. Determined by K. K. Mackenzie.

8. **Acorus Calamus* L. A large clump is established on a gravel-bar in Mill Creek at Salem. Not observed in cultivation.

9. **Brodiaea uniflora* (Graham) Baker. Common in cultivation, and escaping to lawns in some places in Salem. The bulbs have a distinct alliaceous odor!

10. **Muscari comosum* (L.) Mill. Well established in a grain-field 2½ miles north of Waconda, Marion Co. Nowhere in cultivation.††

11. **Allium neopolitanum* Cyrill. Along the outside of the fence surrounding the city cemetery, Salem. Perhaps originally introduced with cut flowers at funerals. Determined by Bayard Long.

12. **Beta vulgaris* L. Not infrequent in waste places about Salem.

13. **Papaver somniferum* L. Common in cultivation, and occasionally escaping to rubbish-heaps and vacant lots, but less common than *P. Rhoeas* L.

† Cp. Maxon in Am. Fern Journal **11:** 107. 1921.
†† See Rhodora **24:** 208–210, 1922.

14. **Malcomia maritima* (L.) R. Br. A few specimens were brought in by a high-school pupil, who reported them as growing in a fallow field in the north part of Salem, but the station has not since been found. Determined by Bayard Long.

15. **Rosa multiflora* Thunb. On rubbish heaps and roadsides near Salem. Determined by P. A. Rydberg.

16. **Spartium junceum* L. Occasional in cultivation, and established in a pasture in Salem. Determined by C. A. Weatherby.

17. **Medicago arabica* Huds. Fully established in a pasture along the Pacific Highway, three miles north of Salem.

18. **Medicago sylvestris* Fries. A few plants have persisted in a yard on Front St., Salem. Determined by C. A. Weatherby.

19. *Lupinus lignipes* Heller. In gravelly soil along the railroad tracks at West Salem, Polk Co. Has probably been confused with *L. columbianus* Heller. Determined by C. P. Smith.

20. **Geranium columbinum* L. In a potato-field surrounded by woods, one-half mile east of Kingston, Linn Co.

21. **Oxalis violacea* L. In a vegetable-garden along the railroad-track near the State Prison, Salem.

22. *Euphorbia crenulata* Engelm. Occasional in rocky woods throughout the Willamette Valley. Both this species and *E. dictyosperma* Fisch. & Mey. are abundant on a wooded hill at Eola, Polk Co.

23. **Hypericum calycinum* L. This handsome shrubby species occasionally escapes to roadsides about Salem. Determined by C. A. Weatherby.

24. *Centunculus minimus* L. In a dry ditch by the roadside 3 miles southeast of Salem. Determined by M. E. Peck.

25. **Anchusa italica* Retz. Very common in cultivation, and escaping to a thicket along a stream at Salem. Determined by John M. Fogg Jr.

26. *Pentstemon aggregatus* Pennell. In low ground at the foot of a railroad embankment near Cook Station, Clackamas Co. A species of the Rocky Mountain region, that does not appear to have been previously reported in the Northwest. Perhaps confused with *P. ovatus* Dougl. Determined by F. W. Pennell.

27. **Valeriana officinalis* L. Frequently cultivated, and spreading to roadsides near the city cemetery, Salem.

28. **Helianthus scaberrimus* Ell. A species of the Middle West that is common in gardens, and freely escaping to waste grounds and fields.

I am under obligation to all the botanists mentioned above for their kindness in determining difficult specimens. A few further notes may be added by way of correction and extension of previous lists:

1. *Lolium perenne* L. var. *cristatum* Doell, which has rested on a single specimen from Eola, Polk Co., has appeared in waste ground in many places about Salem.

2. *Carex Hallii* Bailey is now referred by Mackenzie to *C. nudata* W. Boott (Erythea **8**: 80. 1922).

3. *Carex specifica* Bailey var. *brevifructus* Kük. is referred by the same authority to the new species *C. fracta* Mackenzie (l. c. **8**: 38).

4. *Carex olympica* Mackenzie is now referred by the author to *C. pachystachya* Cham. (l. c. **8**: 45).

5. *Sisymbrium Sophia* L. is now common about the railroad cattle-pens at Salem.

6. *Lobularia maritima* (L.) Desv. is not infrequent on rubbish-heaps and street-parking about Salem.

7. *Galium tricorne* Stokes is abundant in grain-fields at Eola, Polk Co.

8. The "*Erigeron corymbosus* Nutt." of the list in Torreya **18**: 30. 1918 (no. 135) is according to H. M. Hall *E. decumbens* Nutt.

9. *Peltiphyllum peltatum* (Torr.) Engler, which was reported in Torreya **18**: 223. 1918 as "observed from car-window" along Mary's River in Benton Co., was confirmed this spring by a student who brought in a specimen from the same locality.

10. "*Potentilla canadensis* L.," No. 30 of the list in Torreya **18**: 224, is determined by Bayard Long as a double-flowered form of *P. procumbens* Sibth., with five leaflets instead of three (perhaps the forma *pentamera* Rydb.)

11. "*Convolvulus polymorphus* Greene." Further study and comparison with authentic specimens seem to place this nearer *C. occidentalis* Gray.

12. The "*Cryptantha Torreyana* (Gray) Greene var. *grandiflora* (Rydb.) Nels. & Macbr." (Torreya **18**: 225), and the "*C. Hendersonii* (Nels.) Piper" (no. 67, Torreya **20**: 40. 1920)

seem to be the same thing, but further study is urgently needed.

13. "*Allocarya californica* Greene" (no. 47. Torreya **18**: 225) has been described as a new species by Piper in his recent revision of the genus (*A. granulata* Piper).† The type-locality is at Salem.

14. "*Azolla caroliniana* Willd." (no. 1 of the list in Torreya **20**: 40. 1920) is determined by W. R. Maxon as *A. filiculoides* Lam. It is abundant in stagnant water on the shore of the Willamette at Salem.

15. *Xanthium oviforme* Wallr. This is not a "species of the Orient," but is indigenous to the Columbia Valley, where it was discovered by Douglas.

Perhaps the most interesting range-extension of the past season was afforded by the discovery of *Danthonia pinetorum* Piper (*D. thermalis* Scribn.) on the top of a rocky cliff on the south side of Oswego Lake in Clackamas Co. The type-locality is in Mason Co. Wash., and the species seems not to have been previously reported from south of the Columbia River.

Bromus sitchensis Bong., which Piper and Beattie (Fl. N. W. Coast 51) assign to "moist banks along the sea-shore," was found along the dry border of a hop-yard in the Willamette River bottom near Livesley Station, Marion Co., and determined by Agnes Chase, as was the Danthonia also.

Senecio Harfordii Greenm., which has been regarded as endemic in the Columbia Gorge, has been found as far south as in the Cascades as Silver Creek Falls in Marion Co., and was observed in abundance on Bowman Butte in Clackamas Co., about 15 miles northwest of Mt. Hood.

Salem, Oregon.

THE RECORDS FOR LIMNOBIUM SPONGIA IN THE NORTHERN UNITED STATES

By Kenneth K. Mackenzie

One of the most interesting and at the same time troublesome records for New Jersey is Knieskern's of the rare occurrence of *Limnobium Spongia* at Swimming River, Monmouth County. Nothing has turned up from any part of New Jersey since the

† Contr. U. S. Nat. Herb. **22**, Part 2; 109. 1920.

time of Knieskern to substantiate his record. *Limnobium* looks very much like *Heteranthera reniformis*, which was not given by Knieskern in his Catalogue. This last named plant has been found in various parts of New Jersey, altho I have not been able to find any station closer to Swimming River than Milltown, Middlesex County, and Mr. Macy Carhart of Keyport, who has devoted special attention to Monmouth County writes that he has never found it. Under all of the circumstances it seems to me better in the absence of further data to adopt a negative attitude concerning the record and to say that we need more evidence before we can safely include *Linmobium* as a New Jersey plant.

The fact that *Limnobium* is an extremely rare and local plant in the northern United States does not ever seem to have been much emphasized. It is a species which finds its real home in the low country in the southern part of the United States, and from there it extends up the Mississippi Valley to southern Illinois, and up along the Atlantic Coast to northern Delaware. In addition it has been collected in western New York, and from the standpoint of geographical distribution it may be regarded as one of the most interesting plants found in New York.

An old specimen from western New York still in excellent condition is preserved in the Torrey herbarium at the New York Botanical Garden and has on it the following data: "Found on the shores of Lake Ontario in the town of Greece, Monroe County, New York. It grows in stagnant waters, surrounded with Azolla. Received in a letter from Samuel Bradley, Postmaster of Greece, dated April 21st, 1828. I saw a few weeks ago in the herbarium of Mr. Conrad of Philadelphia, a specimen of this plant, said to have been found in Rochester, New York."

In addition to the above there is a specimen apparently of the same collection in the Gray Herbarium received from the Wm. Boott herbarium and a specimen at the Philadelphia Academy of Natural Sciences marked as from "Genesee, N. Y." I am informed by Mr. M. S. Baxter of Rochester, that the plant has not been found in recent years in western New York. Dr. Homer House the State Botanist knows nothing of it beyond the Bradley record and Paine's citation (Cat. Pl. Oneida Co. 134) of Sartwell also as having collected it.

Outside of the specimens from western New York the only specimens from "the Manual range" in the larger herbaria are: (1) Delaware City, Delaware, collected by Commons. The plant is said to be "rare" and to grow in "shallow ditches." Specimens from this collection are in the Gray Herbarium, and in the herbariums of the N. Y. Botanical Garden, Philadelphia Academy of Sciences and Missouri Botanical Garden; (2) Vicinity of Cape Henry, Virginia, at the Smithsonian Institution; (3) Eight miles west of Jonesboro, Union County, Illinois, on the Mississippi, collected by Dr. Vasey, many years ago. Specimens are at the Missouri Botanical Garden and Gray Herbarium; (4) St. Francis River, Missouri and vicinity; one specimen collected by Widmann in 1895, and three by Trelease in 1897, are all at the Missouri Botanical Garden. Mr. Chas. C. Deam writes that it is not known from Indiana, where it would be expected if the western New York plants are to be considered as part of a Mississippi Valley flora.

From the above it will be noted not only how rare the species is in the northern United States, but also that there is no record of its collection for nearly twenty-five years. I very much doubt whether a specimen from the northern United States exists in any private collection in the country. I know that it is a species that I have been vainly hoping to get for many years. It is interesting also to note that a large part of the material collected is either sterile or in poor condition, and the old Bradley specimens are the best ones seen.

New York City.

A NOTE FROM THE OKEFINOKEE SWAMP

By E. Eugene Barker

During the Easter Vacation of the Spring of 1922, a party of professors and students from the University of Georgia visited the Okefinokee Swamp. Headquarters were made at Billey's Island, where the Hebard Cypress Company very kindly afforded the party accommodations at the boarding-house for their employees. On April 11, a trip was made by boat to Floyd's Island, where the night was spent in camp, the party returning next day. In order to reach this island it was necessary

to cross several miles of open marsh called" prairie." Over most of it the water is shallow and densely choked with aquatic vegetation, making it exceedingly difficult to push the boats along. Only here and there are small open waterways and trails or holes kept clear by the alligators. In places woody plants, followed by trees have gained foothold, and in the more advanced stages of this sort of formation mature cypress trees (*Taxodium imbricarium* and *T. distichum*) form the climax. We may suppose that in this way the extensive cypress "bays" have been formed from the open swamp in times past. The soil in such places is only rarely exposed, at times of extreme low water; at all other times the trees stand with bases submerged in the water.

On passing across the prairie the following plants were observed growing in greater or less numbers and seemed to be characteristic flora of this particular habitat:

Wholly submersed society

Utricularia purpurea Walt.

U. subulata L.

Droscera capillaris Poir. (No flowers seen at this date.) The stems floating without any roots or other attachments.

Sphagnum sp. (Floating without any attachment.)

Partially submersed society:

Nymphaea advena Soland.

Castalia odorata (Ait.) Woodville & Wood.

Castalia odorata var. *gigantea* (Tricker) Fernald.

Saggitaria sp.

Pontederia cordata var. *angustifolia* Torr.

Orontium aquaticum L.

Iris caroliniana Wats. (Occasional along the margins of the prairie).

Woodwardia virginica (L.) Sm. (No fertile fronds yet).

Sarracenia minor Walt.

Calopogon pulchellus (Sw.) R. Br. (In flower).

Limodorum tuberosum L.

Panicum digitarioides Carpenter (Maiden Cane).

In the open prairie where the water has a depth of several feet the major formation is Nymphaea and to a lesser extent, Castalia with masses of floating Utriculaira and Sphagnum

choking the water between. Where the soil is close enough to the surface to admit their growth, large areas are covered with the chain-fern (*Woodwardia*), and rarely, where the mud is exposed or is covered with sphanum moss, Limodorums and Calopogons and pitcher-plants (*Sarracenia*) are to be found. The never-wets (*Orontium*) grew in tufts and sometimes in large societies where the water was not very deep, but this plant seemed to be more characteristic of the borders of the open waterways and "lakes." At this time they were very beautiful with their great velvety green leaves and flowers of striking colors and form. The inflorescence has no spathe but the naked spadix about two inches in length is brilliant golden yellow when covered with pollen; below this an area of equal length purest gleaming white, succeeded by another area of mottled red merging into the green of the scape.

Department of Botany, University of Georgia,
Athens, Georgia.

BOOK REVIEW

Schaffner's Field Manual of Trees*

The popular demand for this excellent little pocket manual is reflected in the appearance of a second edition. Except for the correction of a few typographical errors and certain minor changes, the subject matter is the same as in the first edition, published in 1914, (see review in Torreya **14**: 110–111). G. E. Nichols.

PROCEEDINGS OF THE CLUB

Meeting of May 31, 1922

This meeting was held in the Museum of the New York Botanical Garden, beginning at 3:30.

Mr. M. French Gilman, Banning, California, was elected to membership.

* Schaffner, J. H. Field Manual of Trees, including southern Canada and the northern United States to the southern boundary of Virginia, Kentucky, and Missouri, westward to the limits of the prairie. Pp. 1–154. Second edition. Columbus. 1922.

The chairman of the Field Committee was authorized to make necessary expenditures for expenses of guides for field meetings during the summer.

The treasurer was requested to express to the executors of the estate of the late Mary S. Andrews the Club's appreciation of their services in connection with the remittance of her bequest to the Torrey Botanical Club. It was voted to refer the use and designation of this bequest to the Finance Committee.

A special committee, appointed to draft resolutions on the death of Mrs. Alice R. Northrop, reported as follows:

WHEREAS: Mrs. Alice R. Northrop, who for many years has been a member of the Torrey Botanical Club, died suddenly on May 6th.

RESOLVED: That the members of this Club take the opportunity to recognize her long and disinterested service in the cause of Nature Study in the public schools and her widespread influence among teachers and pupils in the work that she so ably accomplished, and

RESOLVED: That the foregoing preamble and resolution be entered on our minutes, be printed in Torreya, and that a copy be sent to her family.

ELIZABETH G. BRITTON
EDWARD S. BURGESS } Committee
MARSHALL A. HOWE

The scientific program consisted of a discussion of "Climatic and Soil Factors of Long Island Vegetation" by Mr. Norman Taylor.

A study of evaporation and soil factors on Long Island shows that Montauk at the eastern extremity of the Island has the highest evaporation and the greatest annual amount of wind velocity, and that this, with the porous soil, is correlated with a total absence of forest. Somewhat similar conditions obtained on the Hempstead Plains. and on the Shinnecock Hills, both of which are treeless. The second most unfavorable environment is the great central pine-barren region where the evaporation and moisture-holding capacity of the soil is only slightly less than at Montauk. The typical oak-hickory forests along the north shore were shown to have the most favorable environmental conditions both as to soil and evaporation.

After discussion, adjournment followed.

MARSHALL A. HOWE
Secretary

NEWS ITEMS

In our March-April number appeared a note regarding an advertisement by the Brooklyn Botanic Garden for the largest tree on Long Island. Over two hundred answers were received with records of over three hundred big trees. The largest tree reported is a Sycamore 24 feet in circumference, the next largest a White Oak, 19 feet 7 inches in circumference.

"Game Laws for Ferns and Wild Flowers" is the title of an article in the American Fern Journal for September, 1922, and reprinted for distribution by the Brooklyn Botanic Garden. This describes the Vermont law for the protection of wild plants and suggests similar laws for the protection of rare plants, or those needing protection, in other states.

ERRATA

Page 20, line 4 read 1901 to 1920 instead of 1910 to 1920.
" 44, " 19 " *villosissimum* instead of *villosissimumi.*
" 49, " 22 " Chimons instead of Chimmons.

INDEX

(The names of species and varieties described as new and of new combinations are in **bold faced type**.)

TORREYA

A BI-MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

John Torreya, 1796-1873

EDITED FOR

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BY

GEORGE T. HASTINGS

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NOTES ON THE BALLAST-VEGETATION AT LINNTON, OREGON

James C. Nelson

A few notes on the vegetation of the ballast-area at Linnton, Oregon, now included within the city limits of Portland, appeared in Torreya 17: 151–161. 1917. Since the first visit in 1915, the station has been visited at least twice each season. The list of species originally reported included many of tropical or subtropical origin. These were unable to survive the winter, and disappeared after the first season, although the seeds had probably remained dormant for years after the ballast was first deposited. During the war the entire area, which had long remained undisturbed, was utilized by a ship-building firm. A "cradle" was constructed, which with its planked-over approaches covered perhaps one-fourth of the original area; various tool-sheds and machine-shops were erected, the ground was excavated in many places, and tramped over daily by hundreds of men and horses, so that the vegetation was subjected to a rigorous test and much of it wholly eradicated. Since the conclusion of the war the ship-yard has been abandoned; but as on account of its water-front the site offers a desirable industrial location in the rapid expansion of Portland along the Willamette, it is now being "promoted" by real-estate firms, and on my last visit I found that sand was being pumped from the river to fill in the low places and establish a uniform level—an operation which threatens to smother another considerable part of the surviving vegetation.

But in spite of all these drawbacks, and the further disadvantage that the sand and coarse gravel composing most of the ballast dries out very thoroughly each summer, several of the species originally recorded still persist, and may safely be regarded as permanent additions to the flora of Oregon. Most of these have effected a lodgment on the higher ground in the rear, along the railroad-track, where they run less risk of being

disturbed by building operations. Since most of these species occur rarely or not at all elsewhere in Western Oregon, a list of those that appear most likely to persist is herewith presented:

1. *Bromus brizaeformis* Fisch. & Mey. Not uncommon east of the Cascades, but apparently not elsewhere established in the Willamette Valley.

2. *Ammophila arenaria* (L.) Link. This maritime grass is specially adapted to situations of this type, and will be most difficult to eradicate on account of its long tough rootstocks.

3. *Urtica dioica* L. This has been given a wide berth on account of its stinging properties, and occupies a considerable area along one side of the "cradle."

4. *Roubieva multifida* (L.) Moq. Prostrate on the sand. This also occurs in the railroad-yards in Lower Albina, some four miles up the Willamette and on the opposite bank, where ballast also seems to have been deposited in the early days.

5. *Lepidium Draba* L. This is rarely found on vacant lots elsewhere about Portland.

6. *Brassica incana* Tenore. Very persistent over the entire area.

7. *Diplotaxis tenuifolia* (L.) DC. This also occurs at Lower Albina.

8. *Reseda lutea* L. Only a few plants, but persistently reappearing each year.

9. *Reseda Luteola* L. Also at Lower Albina.

10. *Lotus corniculatus* L. This varies greatly in frequency in successive years, but has never entirely disappeared.

11. *Medicago minima* L. Covering the ground in dense mats of considerable extent.

12. *Ulex europaeus* L. Two or three vigorous specimens have persisted. A few isolated plants occur elsewhere in Western Oregon, but it does not show the disposition to spread which is manifested by its near relative, *Cytisus scoparius* (L.) Link.

13. *Melilotus officinalis* (L.) Lam. This seems to flourish exceptionally well on the ballast, reaching a height of 7–10 feet even in dry gravel.

14. *Melilotus indica* (L.) All. During the last year this has been reported from several other stations, and seems to be coming in from the southward.

15. *Verbena officinalis* L. One large clump near the "cradle" has persisted. This has been found well established in the village of St. Paul, Marion Co.

16. *Matricaria inodora* L. Established over the entire area, and escaping to the adjoining territory.

17. *Senecio Jacobaea* L. Also thoroughly established—continues to flower throughout the year, much like *S. vulgaris* of the gardens.

18. *Artemisia vulgaris* L. The most abundant species of the area, forming dense thickets. A less-branched form, with the leaves mostly entire, occurs in Lower Albina.

19. *Carduus nutans* L. Stubbornly persisting over the entire area.

20. *Franseria bipinnatifida* Nutt. Prostrate on the sandy areas. Although this species is not uncommon on the coast of Oregon, where it is clearly indigenous, it is worthy of note at a distance of 100 miles from the sea, and as a component of a flora otherwise foreign.

A number of other species included in the original list have reappeared sporadically now and then since the first report; but they can hardly be regarded as sufficiently well established to withstand the vicissitudes that this plant-society seems called upon to encounter in the near future.

Salem, Oregon

THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND, AND GARDINER'S ISLAND, NEW YORK

Stewart H. Burnham and Roy A. Latham

Third Supplementary List*

INSECT GALLS

Amphibolips acuminata Ashm.—Very abundant on *Quercus ilicifolia* at Laurel; determined by Dr. E. P. Felt.

Cecidomyia viticola O.S.—On leaves of *Vitis* at Mattituck; determined by Dr. Felt.

* The Preliminary flora was published in *Torreya* **14**: 201–225. Nov. 1914 and 229–254. Dec. 1914. The First Supplementary List was published in *Torreya* **17**: 111–122. July 1917. The Second Supplementary List was published in *Torreya* **21**: 1–11. Jan.–Feb. 1921 and 28–33. March–April 1921.

Phytophaga rigidae O.S.—On leaves of *Salix discolor* at Southold; determined by Dr. Felt.

MYXOMYCETES

Enteridium splendens Morg.—On wood of *Quercus* at Orient; determined by Prof. John Dearness.

Hemitrichia stipitata (Mass.) Macbr.—Orient on rotten wood of *Quercus velutina;* determined by Prof. Dearness.

Physarum cinereum (Batsch) Pers.—On old corn stalks, *Zea Mays*, at Orient; determined by Prof. Dearness.

EUPHYCEAE

Chara formosa C. B. Robinson—Great Pond, Southold, on pure sandy bottom in 2 feet of water. No. 1181. Determined by Dr. M. A. Howe who says, "a nearly related species has sometimes been identified as *Chara sejuncta* A. Br."

Gloiotrichia natans (Hedw.) Rabenh.—Attached to water plants in ponds; determined by Dr. Howe.

Licmophora gracilis (Ehrenb.) Grun.—Rocks at ebb tide, Gardiner's Bay; determined by Chas. S. Boyer.

Microspora stagnorum (Kütz.) Lagerh.—Shallow pool in woods at Greenport; determined by Dr. T. E. Hazen.

Microspora tumidula Hazen—Shallow pool in woods at Greenport; determined by Dr. Hazen.

Nitella flexilis Ag.—Shallow ponds at Southold; determined by Dr. Howe.

Nitella transilis Allen—Great Pond, Southold, on pure sandy bottom in water 2 feet deep. No. 1180. Determined by Dr. Howe who says, "a nearly related species has sometimes been identified as *Nitella tenuissima* (Desv.) Coss. & Germ."

Synedra tabulata (Ag.) Kütz.—Rocks at ebb tide, Gardiner's Bay; determined by Mr. Boyer.

Tribonema bombycinum (Derb. & Sol.) Hazen—Shallow woodland pool at Laurel; determined by Dr. Hazen.

PHYCOMYCETES

Phytophthora infestans (Mont.) DeBary—Common on potato, *Solanum tuberosum;* determined by Prof. Dearness.

ASCOMYCETES (excluding PYRENOMYCETES)

Aleuria aurantia (Pers.) Fckl.—Bare earth on hills at Orient; determined by Prof. Dearness.

Bulgaria rufa Schw.—On buried wood, Cutchogue; determined by Dr. C. G. Lloyd, who says, "recent writers have proposed to separate this from *Bulgaria inquinans* on account of its hyaline spores." Reported in Mycol. Notes **65**: 1077. Nov. 1920.

Cudoniella marcida (Müll.) Sacc.—On earth in rich woods, Greenport; determined by Dr. Lloyd, who says, "The four species of *Leotia* we have are distinguished chiefly by the color (compare Geo-

glossaceae, p. 15). All usually have greenish color or cast at least, but this species impressed us at once by the absence of any green tint. The stipe is white and the head pale brownish, while *Leotia marcida* usually has a 'greenish olive' head and a yellowish stem. It is the only one of the forms that is not decidedly green, hence we so refer this species rather than to base a new name. The spores are hyaline ($6 \times 20\ \mu$) with no greenish cast. . . . When soaked the plant is a very bright color. It develops a faint greenish tint on the stem but none on the head."

Exoascus alnitorquus (Tul.) Sadeb.—On fruit of *Alnus incana* at Southold; determined by Dr. H. D. House.

Geoglossum hirsutum Pers.—In wet woods on earth, Cutchogue; determined by Dr. Lloyd; Mycol. Notes **65**: 1077. Nov. 1920.

Helotium epiphyllum (Pers.) Fr.—Old leaves in woods at Cutchogue; determined by Prof. Dearness.

Phacidium brunneolum Pk.—On leaves of *Galium Claytoni*, Gardiner's Island; determined by Prof. Dearness.

Pitya cupressi (Batsch) Fckl.—Orient on *Juniperus virginiana;* determined by Prof. Dearness. (*Lachnella cupresii* (Batsch) Phillips.)

ASCOMYCETES (PYRENOMYCETES)

Anthostomella endoxyloides Fairman—"On a dead tree of some species of *Populus*, Orient, N. Y., Sept., 1919, Roy Latham, no. 2073." A new species, described by Dr. Chas. E. Fairman in Proc. Rochester Acad. Sci. **6**: 125. April 1922.

Diaporthe Peckii Sacc.—Orient on *Rhus radicans.* No. 3503. Determined by Prof. Dearness, who says, "I do not know of any other collection of this than the one Peck made in 1885 at Saugerties, N. Y. Dr. Peck calls this *Diaporthe sparsa* but Saccardo changed it to Peckii."

Eutypella angulosa Nitsch—Orient and Greenport on trunks and branches of *Betula populifolia;* determined by Prof. Dearness.

Eutypella Vitis (Schw.) E. & E.—On stems of *Vitis bicolor* at Orient; determined by Prof. Dearness.

Gloniopsis Lathami Fairman—"On dead stems of *Helianthus giganteus*, Orient, N. Y., May 12, 1918, Roy Latham, no. 1194." A new species, described by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 129. April 1922.

Gloniopsis Lathami asymetrica Fairman—"On dead stems of *Lilium canadense*, Orient, N. Y., *May 12, 1918, Roy Latham.*" A new variety, described by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 129–130. April 1922.

Hypocrea patella C. & P.—On oak branches on the ground in dry woods at Cutchogue; determined by Dr. Lloyd. Mycol. Notes **65**: 1077. Nov. 1920, Note 991. *Hypocrea patella* "is a fairly common species around Cincinnati. While there is no doubt of the determination, I do not like the term 'bright yellow' as applied

to it. It is rather orange yellow or antique brown of Ridgway to my eye."

Hypoxylon commutatum Nitschke—Orient, on branches of peach, *Prunus Persica;* determined by Prof. Dearness.

Hypoxylon Howeianum Pk.—Greenport on branches of *Betula lenta;* determined by Prof. Dearness.

Hypoxylon marginatum (Schw.) Berk.—Gardiner's Island and Southold on *Fagus grandifolia;* determined by Prof. Dearness.

Hysterium Prostii Duby—On trunk of *Baccharis halimifolia* at Orient; determined by Prof. Dearness.

Hysterographium praelongum (Schw.) E. & E.—On stems of *Rosa blanda* at Orient; determined by Prof. Dearness.

Hysterographium Smilacis (Schw.) E. & E.—On stems of *Smilax rotundifolia* at Orient; determined by Prof. Dearness.

Melanomma caryophagum (Schw.) Sacc.—On hickory nuts, Orient; as reported by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 101. Sept. 1921. Previously reported as *Trematosphaeria nuclearia* (DeNot.) Sacc.

Nummularia Bulliardi Tul.—On trunk of *Quercus velutina* at East Marion; determined by Prof. Dearness.

Rosellinia aquila (Fr.) DeNot.—Greenport on trunk of *Carya glabra;* determined by Prof. Dearness.

Xylaria brasiliensis (Theiszen)—On earth in a cornfield at Greenport in September. Determined by Dr. Lloyd who says; "We considered and figured this (Mycol. Notes no. 61: 893, Fig. 1559. Oct. 1919) from Brazil, but hardly expected it to come from New York. Surely it is the same plant, the features and habitat—growing in the ground with long rooting base, the simple clubs, the protruding small perithecia and the small spores, $4 \times 6\ \mu$. The spores are smaller than the brazilian plant which measures up to $4 \times 8\ \mu$. Sometime ago we received a lot of *Xylaria* from Carlos E. Chardon, Porto Rico, and one that although immature, we referred to *Xylaria brasiliensis.* We overlooked the label. This was collected by Prof. H. H. Whetzel at Ithaca, and hence Mr. Latham's collection is the second made in the United States. It is a rare find and a fine collection."

MELANCONIALES

Didymosporium propolidioides Fairman—"On old decorticated cedar (*Juniperus*) stump, Orient, N. Y., May 1917, Roy Latham, no. 852." A new species described by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 124. April 1922.

Melanconium sphaerospermum (Pers.) Link—On old stems of bamboo, *Bambusa* at Orient; determined by Dr. Fairman.

Pestalozzia nucicola E. & E.—On hickory nuts (*Carya*), Orient; determined by Dr. Fairman and reported in Proc. Rochester Acad. Sci. **6**: 88. Sept. 1921.

SPHAEROPSIDEAE

Ascochyta Alismatis (Oud.) Trail—On leaves of *Alisma Plantago-aquatica* at Greenport; determined by Prof. Dearness. (*Ascochyta Alismatis* E. & E.)

Leptostroma Mitchellae Fairman—"On dead stems of *Mitchella repens* L., Orient, N. Y., May 1916, Roy Latham." A new species described by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 123. April 1922.

Leptostroma Smilacis Cke.—Orient on stems of *Smilax rotundifolia;* determined by Prof. Dearness.

Phomopsis Arctii (Lasch.) Trav.—On stems of *Arctium minus* at Orient; determined by Dr. Fairman.

Phomopsis sp.—In the note under the description of the new species, *Phomopsis rubiseda* Fairman, from Lyndonville, N. Y., in Proc. Rochester Acad. Sci. **6**: 118. April 1922, Dr. Fairman says: "Mr. Roy Latham sends a *Phomopsis* from Orient, N. Y., no. 425 collected on *Rubus phoenicolasius* Maxim, April 18, 1915, which has pycnidia 65–100 μ in diam. and spores 9–12 $\times$ .05–1 μ borne on slender hamate sporophores 20–24 μ long. On March 16 1916, Mr. Latham collected his no. 811 at Orient, N. Y., on *Rubus procumbens* Muhl., which proves to be another *Phomopsis* with fusoid, guttulate, hyaline spores 6–7 $\times$ 1.5–2 μ which seems referable to *Phomopsis vepris* (Nitschke) Trav., but the Orient specimens have smaller pycnidia and more slender spores. Cultural studies are needed to clear up the variability in the species of *Phomopsis* on *Rosaceae*."

Phyllosticta Lycii Ell. & Kell.—On leaves of *Lycium halimifolium* at Orient; determined by Prof. Dearness.

Phyllosticta Staticis Petrak—On *Limonium carolinianum* at Orient; determined by Dr. Fairman.

Septoria Atriplicis Desm.—On leaves of *Atriplex patula*, var. *hastata* at Orient; determined by Dr. Fairman.

Septoria atropurpurea Pk.—On leaves of *Aster macrophyllus* at Mattituck; determined by Prof. Dearness.

Septoria Lycopersici Speg.—On leaves of tomato, *Lycopersicon esculentum*, common; determined by Prof. Dearness.

Septoria Sii Rob. & Desm.—On leaves of *Sium cicutaefolium*, common; determined by Prof. Dearness.

Septoria Trichostematis Pk.—On leaves of *Trichostema dichotomum* at Laurel; determined by Prof. Dearness, who says; "I think, this must be rather rare. Peck's first finding was in 1888 at Manor, Long Island."

Septoria Verbenae Rob. & Desm.—On leaves of *Verbena urticaefolia* at Southold; determined by Prof. Dearness.

Sphaeropsis cerasina Pk.—On *Prunus serotina* at Orient; determined by Prof. Dearness.

Sphaeropsis Opuntiae Fairman—"On *Opuntia Opuntia*, Orient, N. Y., June 1919, Roy Latham, no. 1807 in part." A new species described

by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 120. April 1922.

Vermicularia dematium (Pers.) Fr.—The *Vermicularia* common on herbaceous stems goes by the name *V. dematium.* "What appears to be the same thing was collected on hickory nuts at Orient, Long Island, N. Y., by Roy Latham in 1919. Mr. Latham's specimens have setae 120–250 μ in height, and fuscoid, curved spores measuring $20–27 \times 2.5–3\ \mu$." Other specimens of this species on hickory nuts in central New York, have setae $70–165 \times 6–7\ \mu$; and spores $17–24 \times 3.5–4\ \mu$. Determined and reported by Dr. Fairman in Proc. Rochester Acad. Sci. **6**: 83. Sept. 1921.

Vermicularia liliacearum Schw.—Greenport on stems of *Lilium canadense;* determined by Dr. Fairman.

USTILAGINACEAE

Melanopsichium austro-americanum (Speg.) G. Beck—Common in cultivated fields on *Polygonum Persicaria* at Mattituck; determined by Dr. H. S. Jackson.

PUCCINIACEAE*

Polythelis fusca (Pers.) Arth. Greenport on *Anemone quinquefolia*, May.

Puccinia Antirrhini D. & H.—Greenport on garden snapdragon, *Antirrhinum majus.*

Puccinia Cyperi Arth.—On *Cyperus Grayii* at Bay View.

Puccinia Majanthae (Schw.) A. & H.—On *Polygonatum biflorum* at Orient.

Puccinia obtecta Pk.—Common on *Scirpus americanus.*

Puccinia Pammelii (Trel.) Arth.—Greenport on *Panicum virgatum;* determined by Prof. Dearness.

Puccinia Polygoni-amphibii Pers.—On *Geranium maculatum*, Gardiner's Island, May 8, 1922. Dr. Arthur says: "The Geranium rust which has its alternate forms on different species of *Polygonums* is a common, wide-spread rust; but this aecial form which you send has not before been reported from your vicinity. It is known from the coast of Delaware and from further inland all along the Atlantic states; but has not been reported from Long Island."

Puccinia Seymouriana Arth.—Orient on *Spartina glabra*, var. *alterniflora*, October: "a new host for this species."

TREMELLACEAE

Hormomyces aurantiaca Bon.—Greenport on wood of *Ilex verticillata;* determined by Dr. Lloyd. "It has curious spores and is to be cfr. with Mycol. Notes, p. 712, fig. 1066."

* Unless otherwise stated, the Rusts were determined by Dr. J. C. Arthur and are preserved in the Herbarium of Dr. Arthur at Purdue University, Lafayette, Indiana.

DACRYOMYCETACEAE

Dacryomyces minor Pk.—On old wood at Orient; determined by Dr. Lloyd, who says, "I refer it to the above with doubt, but it appears to answer the description. It is a small (1 mm.) cushion shape, orange-yellow gelatinous plant, not changing much in drying. If consistently referred, its recent reference to *Dacryomyces deliquescens* is an error. It differs as noted above. But the structure is most puzzling and I think it is no *Dacryomyces*. The hymenial tissue is made up of branched septate hyphae (?) filled with granular matter septate and easily disarticulated into cylindrical hyaline guttulate spores (?). The sections have all the appearance of *Dacryomyces* spores. I find no basidia, although the forked hyphae (?) have much the appearance of *Dacryomyces* basidia."

THELEPHORACEAE

Peniophora laevigata Fr.—Bark of red cedar, *Juniperus virginiana* at Orient; determined by Dr. E. A. Burt, who says, "your specimen affords the first station for this species in the United States: I received a gathering several years ago from Canada."

Stereum albobadium (Schw.) Fr.—Old stems of *Brassica oleracea gemmifera* (Brussels sprouts), "Orient, R. Latham (in Mo. Bot. Gard. Herb., 17267)," reported by Dr. Burt in Ann. Mo. Bot. Gard. **7**: 218. Apr.–Sept. 1920.

HYDNACEAE

Hydnum friabile Fr.—On earth in dry woods, Cutchogue; determined by Dr. Lloyd and reported in Mycol Notes **65**: 1077. Nov. 1920. A species similar to *Hydnum pulcherrimum* B. & C. (*H. septentrionale* Fr.)

(*To be Continued.*)

SHORTER NOTES

An Intensive Local Study in Rhode Island

Mr. Albert E. Lownes, of Providence, R. I., who has recently become a member of the Torrey Club, has done some good work near home. In a square mile of terrain, about four miles from Providence, "containing woods, swamps, fields, a river and some small cliffs," he found during the last spring and summer many plants of more than usual interest, including eleven species of *Orchidaceae.* Among these are numbered *Habenaria bracteata* (Willd.) R. Br. and *H. hyperborea* (L.) R. Br. The latter is new to Rhode Island and the discovery extends its New England range far to the south-eastward.

Mr. Lownes had also the opportunity, which he improved, of observing critically a large number of plants of a hybrid Spiranthes which appears to be *S. cernua* × *gracilis*. Oakes Ames has commented on this hybrid in Rhodora for April, 1921.

These observations of Mr. Lownes have been made just beyond the limits of our Local Flora, but they are of interest to us not only for their particular values but as evidences of what may be done by intensive study of a small area.—H. M. Denslow.

Rudimentary Sporangia on the Royal Fern

An examination of many plants of the royal fern, *Osmunda regalis*, in late May, 1922, disclosed what seemed to be a rather general tendancy for all the fronds to be fertile. On over one third of the plants found some of the sterile fronds had rudimentary sporangia on the margins of the upper pinnae. Sometimes only a few such sporangia were found on the two or three upper pinnules, or the upper pinnules would be contracted and covered with these sporangia, while other plants had as many as six pairs of pinnae—over one third of the entire frond—covered with them. These sporangia were about one third the size of the ordinary fertile ones. All stages were noted from thickened, tooth-like projections at the ends of veinlets to perfectly formed small sporangia. Many of the smaller clumps of the fern, apparently young ones, had no fertile leaves, but some of these had a few leaves with rudimentary sporangia. On about one hundred plants examined, with over a thousand fronds, there were less than two hundred fertile leaves and a somewhat larger number with rudimentary sporangia. A month later the same and other plants were examined. At that time all the fertile fronds had their sporangia open and the fertile pinnae were withered or falling. The rudimentary sporangia, however, were many of them green, others were discolored and softened in decay while a very few—a small fraction of one percent—had opened normally. At this time many new fronds were expanding none of which showed any trace of sporangia. Later in the season plants were examined from time to time without finding sporangia on any of the fronds.—G. T. Hastings.

BOOK REVIEW

The Ferns of Bombay.*

This little volume is intended for beginners. A brief history of the fern flora of the Bombay Presidency is given in the introduction, followed by descriptions of stems and leaves, their shape, venation, and reproductive organs, with a brief sketch of the life history of these plants and mode of cultivation. Under classification there are 54 genera and 143 species described with localities and altitudinal distribution. Keys to species are given under the larger genera and black and white illustrations in the text, with two colored plates. As a simple guide to the ferns and their allies of that region the book may be heartily recommended.

E. G. Britton,
New York Botanical Garden.

PROCEEDINGS OF THE CLUB

Meeting of October 11, 1922

This meeting was held in the botanical lecture room of Schermerhorn Hall, Columbia University.

The following eight new members were elected:

William J. Bonisteel, N. Y. College of Pharmacy.
James A. Faris, Brooklyn Botanic Garden, Brooklyn, N. Y.
Dr. Takewo Hemmi, Kyoto Imperial University, Kyoto, Japan.
Clarence J. Hylander, Hartsdale, N. Y.
Albert E. Lownes, Providence, R. I.
Robert E. Morse, Newark, N. J.
Prof. Mabel A. Rice, Wheaton College, Norton, Mass.
Dr. John S. Ware, Stapleton, N. Y.

Mr. Elba E. Watson, Grand Rapids, Michigan, was reinstated to membership.

The scientific program consisted of informal reports on summer work and observations.

* Blatter, E., & Almeida, J. F. The Ferns of Bombay. Pp. i–vii + 1–228. *pl. 1–15 + f. 1–43.* 1922. D. B. Taraporevala Sons & Co., Bombay. Price 7 s. 8 d.

Mr. A. T. Beals remarked on slime-moulds collected during the summer, with an introductory sketch of the general morphology of the group, their natural habitats, and best methods of preservation.

Dr. F. J. Seaver reported on a field trip to Elmsford, N. Y. *Glonium stellatum*, a fungus not previously observed by him in the local flora region, was among the plants collected.

Dr. Alfred Gundersen made some observations on the flora of the northeastern parts of the Catskill Mountains.

The absence of trees common near New York, such as hickories, locust, sweet gum and all oaks except the red, together with the abundance of species such as fir and white birch, gives to the higher regions of the Catskills a distinctly northern aspect.

Above 2000 ft. elevation in the region surrounding the Big Hollow valley red oak was found only on the south slope, fairly common up to and slightly above 3000 ft. elevation. White pine and American elm were seen rarely and only on the lower south slopes. Sugar maple, American linden and American ash were more common on the south than on the north slope. Red spruce, white birch, pin cherry and mountain maple were common on both slopes; fir, hemlock, yellow birch, mountain ash and striped maple most abundant on the north slopes, black spruce occasional there; these all grew up to or near the summit of Black Dome, 3990 ft., third highest of the Catskill mountains.

Chestnut, entirely absent from this part of the mountains, is frequent on the Hudson valley slopes up to 2000 ft. elevation and occasionally higher. While the trees are usually attacked by the bark disease, many seem to be in fairly good condition. Another plant found only on the east side of the mountains is mountain laurel, abundant in places between 1600 and 2200 ft. elevation.

It is well known that going northward there is an increasing similarity in American and European plant and animal life. Thus it is of interest that in the region studied the genera of trees are just those of Norway, with the exception of hemlock and fir, absent from northern Europe. Of shrubs two species are the same in the Catskills and in Norway, juniper and alder (*Alnus incana*). In ferns and clubmosses there is a much greater correspondence.

Dr. M. A. Howe gave a brief account of the 1922 dahlia border at the N. Y. Botanical Garden and invited those interested to see it while at its best.

Dr. Tracy E. Hazen outlined his three months connection with the Colombian Expedition of 1922. Arriving at Buenaventura on July 8th, the railroad journey of some seven hours to the summit of the pass of the western Cordillera of the Andes is one of surpassing interest botanically, with a constant succession of beautiful scenes; mangrove swamps, tropical forest abounding in Heliconias, Cecropias, tree ferns and fascinating panorama of varied palms; the narrow gorge of the Dagua river opening up above into a most surprising cactus and acacia desert, to which later a very rewarding visit was made in company with Mr. Killip and a camera.

At an elevation of 5,250 feet, the village of La Cumbre, built up almost entirely since the establishment there through private American enterprise of the well equipped Smith Clinic, commanding magnificent views of mountain and valley, and surrounded by rich subtropical forest, was a most delightful base for a week at the beginning and again at the end of the trip. Descending to the Cauca valley, the other members of the expedition, Dr. F. W. Pennell and Mrs. Pennell and Mr. Ellsworth P. Killip, who for some weeks had been in the south at Popayán, were met at Cali. Down the Cauca by river boat to Zarzal, thence by mule train up into the Quindio region of the Cordillera Central occupied the latter half of July and August. From Salento as a base, the ride with Mr. Killip over the historic Quindio trail to Ibague furnished perhaps the greatest combination of exhilarating scenery and memorable botanizing of the summer, with its great variety of orchids and passion flowers, and, finest of all the miles of trail through the forest of majestic wax palms (*Ceroxylon andicola*).

Through the courtesy of Señor Alfonso Tobon, about two weeks were spent above Salento at Alaska, the mountain estate of the Tobon family, which stretches up through fine temperate forest to paramo and snow fields. The flora of the high moor surrounding the expedition camp on the high paramo at the foot of the Nevado del Quindio was enticing for the photographer: a profusion of dwarf gentians, lupines, heaths, figworts, and composites, surrounded by the tall, densely woolly Frailejon (*Es-*

peletia) and other composite shrubs. The return journey to the west coast also furnished features of unfailing interest.

Dr. Michael Levine gave a brief account of some aspects of his summer's work in the laboratory of the Montefiore Hospital, where he was engaged in some comparisons of animal cancers and the tumors, galls, or cancers of plants. In the tumors or galls of plants there appear to be no giant cells and multipolar spindles such as occur in animal cancers. And there is no conclusive proof that the so-called "strands" in animal cancer have any homologies in the cancer-like growths of plants, though *Ricinus* has something resembling these strands. Radium emanations were found to inhibit the growth of tumors in *Ricinus*.

Mr. Edgar Nelson made some remarks on his work in collecting the pollen of various plants for the use of physicians who are investigating the relation of various kinds of pollen to hay fever. It appears that each victim of hay fever is affected by one particular kind of pollen and that physicians now determine the particular kind by experimental inoculations with extracts of the pollens of the suspected species of plants.

MARSHALL A. HOWE,
Secretary.

MEETING OF OCTOBER 25, 1922

The meeting of the above date was held in the morphological laboratory of The New York Botanical Garden.

Dr. Aniela Kozlowska, 120 Madison Avenue, was elected to membership.

The scientific program consisted of a discussion of "The Cacti of the Atlantic Coastal Plain" by Dr. N. L. Britton and Dr. John K. Small. Dr. Britton introduced the subject by referring to the extensive systematic studies of the cactus family that have been in progress for several years with the cooperation of The New York Botanical Garden and the Carnegie Institution of Washington. Three volumes of the beautifully illustrated cactus monograph, embodying the results of these studies by Drs. Britton and Rose, have already been issued, and the manuscript for the fourth and final volume is now being sent to the printers. Dr. Britton then referred to field studies of the

cacti of the Atlantic Coastal Plain, especially of Florida, recently made by Dr. Small, with the support and cooperation of Mr. Charles Deering.

Dr. John K. Small then gave a summary of the progress of our knowledge of the Atlantic Coastal Plain cacti during the past twenty-two years. At the beginning of the present century 7 species were commonly recognized for this area; in 1918 the number had been increased to 12; and now, in 1922, about 40 species are recognizable. Of these species, 4 are naturalized and the others are without doubt natives. Thirty six of them occur in Florida only. The island of Nantucket is the most northern range of the family. After this introduction the meeting was adjourned to one of the greenhouses in Conservatory Range No. 2, where all of the species of the Atlantic Coastal Plain were represented by living plants, whose leading characteristics and relationships were pointed out by Dr. Small.

Marshall A. Howe,
Secretary.

Meeting of November 14, 1922

The meeting was held at the American Museum of Natural history. The chairman announced the subject of the meeting to be "Wild Flowers and their Insect Visitors" and introduced the speaker, Professor O. P. Medsger.

Professor Medsger spoke of the general adaptations of plants to secure pollination by means of the wind or by insects, showing pictures of many plants, some with the insects on them, and described his own observations on pollination. He showed pictures of timothy grass in blossom, showing how well it is adapted for wind pollination, then told of seeing bumble- and honey-bees climbing up the heads in the early morning, gathering the pollen. Many plants well adapted for wind pollination are visited and must often be pollinated by insects that feed on pollen. In contrast, the arbutus and lily of the valley, plants adapted by odor and nectar to secure insect visitors, seem to be rarely visited and seldom set fruit. The azalea and rhodora are visited by bumble-bees and butterflies which easily reach into the long corolla tubes. The mountain laurel is visited by bumble-bees and small native bees. The four-leaved milkweed is one of the few flowers visited by the honey-bee. Honey-bees

seem to visit few of our native plants, but commonly pollinate introduced plants such as butter and eggs, white clover, and thyme. The last-named plant, where introduced into the Catskill Mountains, has become so abundant in some localities as to ruin farms but make bee-keeping successful. At least forty-five species belonging to the Mint Family alone, have been introduced from Europe into eastern United States. A large majority of these seem to be pollinated by the honey-bee. The members of our rich native flora, lived, bloomed, and produced seed ages before the honey-bee was introduced from abroad. The most important insects in the pollination of our native flowers are the bumble-bees. For example, they regularly visit the hepatica, trilliums, moss pink, cyprepedium, wild geranium, columbine, Bouncing Bet, clematis, jewelweed, wild carrot, sumach, milkweed, mallows, closed gentian, thistle, and asters. The columbine is also on rare occasions visited by humming-birds. The bumble-bee sometimes robs the columbine by biting into the nectaries from the top and so transferring no pollen. They do the same thing with the fringed polygala and jewelweed.

Mining-bees, resembling bumble-bees in appearance, live along the edges of the Jersey marshes, and carry enormous masses of pollen which they fashion into balls about half an inch in diameter to act as food for the developing larvae. These bees visit the rose mallows in great numbers. Other mining-bees, especially valuable in fertilizing the smaller native blossoms, are those belonging to the genera *Andrena* and *Halictus*.

Flies are important visitors of many plants; the false and two-leaved Solomon's seal, white baneberry, black snakeroot, and skunk cabbage are visited chiefly by flies and all produce abundant fruit. The wild carrot is visited by several varieties of insects, but chiefly by flies resembling wasps. The evening primrose is visited by moths, especially hawk-moths. The Joe-Pye weed, boneset, and thistles by butterflies and such day-flying moths as *Thisbe*.

The plant on which most insects were seen was the staminate plant of staghorn sumach. On one flower cluster fifteen species were seen at one time, another cluster showed thirty insects of fourteen species. In the closed gentian bumble-bees insert their tongues, then push in the head and all or nearly all of the body. When they back out a little fringe of white is left at the

top of the flower so that one can tell at a glance which flowers have been visited.

Tragedies are sometimes observed, as bees or flies caught by their feet by the pollen masses of the milkweed and held till dead, or bumble-bees unable to get out of the pouches of the lady's-slipper (*Cypripedium*) and perishing in their beautiful prisons.

George T. Hastings,
Acting Secretary.

Meeting of November 29, 1922

This meeting was held in the Morphological Laboratory of the New York Botanical Garden,

Dr. Barnhart exhibited a beautifully bound set of Michaux's North American Sylva, recently presented to the Club by Mrs. Richard M. Hoe. This was the Philadelphia edition of 1859, including three volumes of the English translation of Michaux's original work, supplemented by two volumes written by Thomas Nuttall.

The first paper on the scientific program was by Dr. Mel T. Cook, his subject being "Recent Studies of the Brown Rot of the Peach."

The brown rots of pomaceous and drupaceous fruits are due to fungi, at least one of which was first described by Persoon in 1796 as *Torula fructigena.* In 1801 he transferred this to *Monilia.* About the middle of the last century it was asserted that there were two species in England, *M. fructigena* on pomaceous fruits and *M. cinerea* on drupaceous fruits. In America, however, the species which is especially destructive on drupaceous fruits and rare on pomaceous was supposed to be the former. In 1902, J. B. S. Norton discovered the perfect stage and assigned it to *Sclerotinia fructigena.* In 1913, Matheny stated that it was properly *S. cinerea* and this view has been very generally accepted by the American mycologists.

The fungus attacks (a) peach fruit, causing a rot; (b) peach twigs, causing them to die back; (c) peach blossoms, causing a blight, frequently supposed to be frost; (d) peach twigs and branches causing canker.

The cankers have been discussed by many workers. The speaker has determined that the fungus is frequently carried over by canker on the new growths and this has been verified by several workers. Very similar cankers are frequently formed as a result of spray and dust injuries. The mycelium rarely penetrates into the xylem.

The apothecia are formed on old mummied peach fruits lying on the ground in uncultivated orchards, especially those growing in wet clay soil.

The second paper was by Dr. Arthur Hollick on "Some Fossil Fruits of the Tertiary of the West."

Dr. Hollick first remarked upon the genus *Ficus*, of which about 600 living species and about 300 fossil species have been described. Most of the fossil species have been based upon leaf impressions and the genus has been a sort of catch-all for leaf impressions of rather doubtful relationships. One genus (*Ficoxylon*) has been based upon wood of *Ficus* affinities and seven species have been based upon fruits. Of these seven, one is from the Middle Cretaceous of Greenland, two from the Middle Cretaceous of Kansas, two from the Lower Tertiary of Wyoming and Montana, one from the Middle Tertiary of Colorado, and one from the Quaternary of British Columbia. Specimens of fruits of *Ficus Ceratops* Knowlton from the Eocene, Fort Union formation, of Montana, and of *F. neurocarpa* Hollick, from the Dakota group of Kansas, were exhibited.

Dr. Hollick also showed fossil cones of *Sequoia* from the Eocene of North Dakota and leafy twigs from the Eocene of Alaska, with cones and branches of the living Sequoias of California for comparison.

The recent death of Professor Elias J. Durand of the University of Minnesota, a member of the Club, was announced, and the chairman appointed Professor Robert A. Harper, Dr. F. J. Seaver, and Mr. James A. Crawford as a committee to draft suitable resolutions.

Adjournment followed.

MARSHALL A. HOWE,
Secretary.

Meeting of December 12, 1922

The meeting of the above date was held in Lecture Room 139 of Barnard College. The speaker of the evening, Dr. D. T. MacDougal, discussed "The Constitution and Action of Living Matter."

Living matter, Dr. MacDougal stated, is made up mainly of gums or mucilages, soaps, and lipoids or fatty substances. These substances are mixed together, but are not dissolved in each other, and the intimate processes that constitute life take place chiefly in the liquids which fill the spaces in this complex sponge. Twist and tangle together a few hundred short frayed fibers of cotton, silk, wool, and linen, wetted in mucilage, and you will have a model of the invisible structure of protoplasm, magnified many thousand times.

Our inquiries have been rewarded so far as to allow us to see that the building materials of the protoplasmic city, like brick, stone, metal, boards, and cement, enter sparingly into compounds with one another and simply adhere and intermix. The proteins may dissociate to some slight extent, the soaps are known to form several kinds of ions, and these substances liquefy the lipoids; beyond this, substances of the four named groups of colloidal material do not diffuse into each other or dissolve each other, so that they must, upon admixture in a liquid condition, set or form a gel in which the separate substances would form interlaced meshworks.

Beyond the recognition of such objects as starch grains, oil drops, crystals, etc., as separated material, any distinction between the living and non-living in the cell is purely academic and hence futile to the physiologist. In this connection, reference may be made especially to the wall, which with its liquefiable pentosans and lipoids may well be regarded as a living part of the cell until it reaches extreme age or highly specialized differentiation.

Life in the last analysis consists of a series of correlated transformations of energy, or chains of metabolism, which take place in the liquid occupying the spaces of a colloidal meshwork. The ions and substances concerned in these never-ceasing changes are at all times subject to the surface forces of the particles or strands of the meshwork, as modified or determined by the electric charges carried.

The meshwork or more solid part of the jelly is in a perpetual state of alteration by hydration and dehydration. When we attach to a living cell-mass a delicate apparatus by which its quiverings are recorded, as has been done by the Indian mystic Bose, we get results comparable to those which could be procured by registering the vibrations of the walls and floors of a crowded tenement house. Accentuated activity would be noted after sunrise, lulls and minor disturbances recorded during the day, and a subsidence before midnight. These facts would offer but a fantastic basis for any interpretation of the working capacity, qualities, or the nature of the activities of the living human units of the building. Similar studies of the quiverings of the protoplasmic jelly structure have been made by this Indian mystic the basis of fanciful and sentimental interpretations of the action of living matter, which have attained a great vogue, especially among naturalists who have not surveyed the groundwork of physiological action. The comparison here given is both apt and accurate, and the results in question spell but little progress in the solution of any serious physiological problem.

After discussion, adjournment followed.

Secretary.

NEWS ITEMS

Dr. John K. Small, head curator of the museums and herbarium of the New York Botanical Garden, returned on January 10 from a month's visit to southern Florida.

At the annual meeting of the Board of Managers of the New York Botanical Garden, held on January 8th, Dr. Frederic S. Lee was elected President, succeeding Dr. W. Gilman Thompson, who had served in that capacity since the death of Hon. Addison Brown in 1913.

Dr. A. B. Stout, director of the laboratories of the New York Botanical Garden, is spending the scholastic year at Pomona College, Claremont, California, where he is giving occasional lectures on problems of plant-breeding and conducting investigations on sterility and fertility in different varieties of oranges with reference to crop production.

Dr. and Mrs. N. L. Britton and Dr. F. J. Seaver of the staff of the New York Botanical Garden, accompanied by Mr. Carlos E. Chardon of the Insular Experiment Station at Rio Piedras, left New York for Porto Rico on January 20. They will continue their collections and studies of the plants of that island. The manuscript for the first volume of the Flora of Porto Rico is in the hands of the printers.

Dr. Elias J. Durand, professor of botany in the University of Minnesota and a member of the Torrey Botanical Club, died in Minneapolis on Oct. 29, 1922. He was widely and favorably known for his critical studies on the Discomycetes. He was connected with botanical teaching and research at Cornell University from his graduation there in 1893 until his removal in 1910 to the University of Missouri, where he was associate professor of botany until his appointment to the professorship in the University of Minnesota in 1918.

TORREYA

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THE AUSTRIAN FIELD-CRESS AGAIN

John K. Small

Notes by Albert A. Hansen on the Austrian field-cress—**Radicula austriaca** (Crantz), *Nasturtium austriacum* Crantz, *Roripa austriaca* Spach—in the September-October (1922) number of Torreya reminded us of some specimens and correspondence received at The New York Botanical Garden in 1918 and 1920.

Under date of June 10, 1918, Professor A. L. Stone of the University of Wisconsin wrote:

"Under separate cover I am sending you a plant which has developed very obnoxious qualties in one of our farm fields. Just how the plant first became established is a mystery but it seems probable that the seeds were in some alfalfa which was sown on this field about three years ago. I have searched through the authorities on the cruciferae and I am unable to satisfy myself that I am correct in the identification of the plant. If it is one of the [native] cruciferae I believe it must be a variation from the type.

"Will you kindly identify the plant for me and if the specimen which I am sending does not arrive in sufficiently good condition I shall be glad to send another plant."

A week later Professor Stone wrote further:

"Your letter of June 15th has been received and I note your request for fruit-bearing samples of the yellow crucifer which I recently sent you.

"Peculiarly enough this plant has shown a decided resemblance to the *Armoracia Armoracia* in that it seems to produce no fruit in this section of the country. Its roots seem to have exactly the same characteristics as those of the horse-radish in that a very small piece of the root will propagate a new plant. Depending as it does upon its roots for propagation it seems to have no need of seed production and for that reason has not

shown any fruit. I shall watch the plants very closely and if on any of them fruits are produced during the season I shall be glad to send you specimens. It may be possible that by growing a few of the plants in my garden I will be able to bring about fruit production. I shall attempt it at any rate and if I am at all successful I shall be glad to let you know it.

"I think I told you in my former letter that this plant has been spreading over an acre or more of our fields being carried largely on the tools in the preparation of the field for crops."

Just two years later Professor Stone after securing specimens from which we could make a positive specific identification, wrote as follows:

"You may recall that . . . I sent you a specimen of a crucifer which has appeared on the Station farm and which was causing us a great deal of difficulty, No one of us here has been able to identify it, and at the time I sent you the specimen last summer you wrote me that you were much interested in it, but were unable to identify it without the seed pods. I wrote you at that time that like the *Armoracia Armoracia* this plant produced [immature] pods only, which then withered and failed to produce seed.

"I am sending you under separate cover wrapped in damp material another specimen of this plant. You will note that while small seed pods have formed all of them gradually withered away. It has been our experience that during the three years which we have been working with the plant that it has never produced mature seeds.

"I think I wrote you last year that I inferred that the plant had been brought to the University farm through an importation of alfalfa seed purchased from Turkestan.

"Very numerous specimens of weeds are sent to our laboratory each summer, but never have we had specimens of this plant sent to us, and I feel certain that they would have been had it appeared any where else in the State because its habits are such as to cause much anxiety to any farmer if it appears on his farm. In none of our reference works which have been examined thus far have I been able to discover any mention or description of a plant with the habits of growth of this one and for this reason I am inclined to think that we have either an introduced plant or a new species and I hope during the progress of the summer to determine which."

The specimens referred to above are in the herbarium of the New York Botanical Garden.

The quotations from Professor Stone's letters give the history of the introduction of the Austrian field-cress in Wisconsin. Mr. Hansen's paper, referred to above speaks for New York. The occurrence and firm establishment of the plant in these States leads us to suspect that it may also be found in other States and, perhaps, also in Ontario. The prolific and vigorous underground stem-system, far surpassing that of any of our other species of *Radicula* will render it very difficult of eradication if it becomes established.

New York Botanical Garden

FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND

Stewart H. Burnham and Roy A. Latham

Third Supplementary List, Part 2*

POLYPORACEAE†

Cyclomyces Greenii Berk.—Earth in low woods at Cutchogue; reported in Mycol. Notes 65: 1077. Nov. 1920.

Fomes applanatus (Pers.) Fr.—On trunks of *Baccharis halimifolia* at Orient; reported as *Fomes leucophaeus* Mont. in Mycol. Notes 65: 1077. Nov. 1920.

Fomes conchatus (Pers.) Fr.—On trunks of *Baccharis halimifolia* at Orient; reported in Mycol. Notes 65: 1077. Nov. 1920.

Fomes connatus Fr.—On trunks of *Salix nigra* at Southold.

Polyporus epileucus Fr.—On *Quercus velutina* at Greenport; Dr. Lloyd says "a rare species."

Polyporus galactinus Berk.—Cutchogue on old wood.

Polyporus rutilans (Pers.) Fr.—On *Quercus velutina* at Greenport.

Polyporus Schweinitzii Fr.—Southold on coniferous wood.

Polystictus focicola B. & C.—On earth in dry woods, Southold; determined by Dr. Lloyd, who says; "We refer this to *Polystictus focicola* on its large pores, although in reality it is a 'new species.' It is a large pored form of *Polystictus cinnamomeus* with bright cinnamon color, while *Polystictus focicola* proper is a large poroid form of *Polystictus perennis* with dull color."

* Part one of this list was published in Torreya, Vol. 23, No. 1, Jan.–Feb. 1923.

† The Polypores were determined by Dr. C. G. Lloyd and are preserved in the Herbarium of the Lloyd Museum and Library at Cincinnati, Ohio.

Trametes pusilla Lloyd.—Greenport on *Quercus alba;* determined by Mr. Lloyd, who says: "This is the second collection I have received. The original from Dr. Stoker, Minnesota, was publisned and figured on page 774 (of Mycol. Notes, no. 54). We described the pores as white, and so they are on fleshy dried specimens, but on these and on Dr. Stocker's specimens now they have turned reddish."

AGARICACEAE

Cantharellus carbonarius A. & S.—On earth in woods, Southold; determined by Dr. Lloyd.

Flammula sapinea Fr.—On trunk of *Quercus alba* in a swamp at Southold; determined by Dr. Lloyd.

Lentinus tigrinus (Bull.) Fr.—Rotten log of *Quercus velutina,* Cutchogue; reported by Dr. Lloyd in Mycol. Notes 65: 1077. Nov. 1920, who says, "These are the first specimens we have received that are not parasitized."

Marasmius fagineus Morg.—Orient; determined by Dr. Lloyd.

GASTEROMYCETES

Cyathus striatus (Huds.) Willd.—Orient; reported by Dr. Lloyd, Mycol. Notes 65: 1077. Nov. 1920.

Ithyphallus rubicundus (Bosc) Ed. Fisch.—Moore's woods in rich soil, Greenport, July 25, 1920; reported by Dr. Lloyd in Mycol. Notes 65: 1077. Nov. 1920, as *Phallus rubicundus.* Dr. Lloyd says: "Mr. Latham found but a single specimen, but the finding of the plant so far north is noteworthy as illustrative of exceptional northern distribution of tropical species. It is rare in our southern States and I believe has heretofore only been found in Florida. Mr. Latham s plant is *Phallus gracilis* as illustrated in the Phalloid Synopsis, Fig. 6, but as there stated it is only a slender form of *Phallus rubicundus* and the name *gracilis* should be dropped. It is the only one of the genus *Phallus* that is red."

Lysurus borealis (Burt) P. Henn.—On earth in cornfields; Orient and Greenport. Dr. Lloyd says: "You will find many references to this in my writings for it is a Phalloid not known to us 20 years ago. It was named *Anthurus borealis* by Burt but it is a *Lysurus* and probably same as *Lysurus australiensis* of Australia."

HEPATICAE

Calypogeia sphagnicola (Arn. & Perss.) Warnst. & Loeske.—Wet sandy soil at Laurel; determined by Dr. G. H. Conklin.

Lepidozia setacea (Web.) Mitt.—On wet, sandy bank at Laurel; determined by Dr. Conklin.

MUSCI*

Brachythecium acuminatum (Hedw.) Lindb.—Greenport, base of oak trees in wet woods.

Brachythecium plumosum (Sw.) B. & S.—Gardiner's Islano.

Cirriphyllum Boscii (Schwaegr.) Grout.—Earth in dry woods at Laurel.

Ditrichum tortile (Schrad.) Hampe.—Wet sandy bank at Laurel.

Fontinalis Lescurii Sull.—Mattituck in water in a swamp.

Philonotis fontana (L.) Brid.—Gardiner's Island on earth in wet woods.

Polytrichum commune L., var. *perigoniale* (Mx.) B. & S.—In dry woods at Southold.

Sphagnum capillaceum (Weiss) Schrank, var. *tenellum* (Schimp.) A. L. Andrews.—Mixed with *Sphagnum palustre.*

Sphagnum fimbriatum Wils.

Sphagnum imbricatum Hornsch., var *affine* (Ren. & Card.) Warnst.—Laurel.

Sphagnum palustre L.

Sphagnum subsecundum Nees—Gardener's Island in wet woods. No. 3562. "A form of *S. subsecundum* in the broad sense. .for those who separate it into a number of species; it corresponds nicely with *Sphagnum auriculatum* Schimp."

PTERIDOPHYTA

POLYPODIACEAE

Athyrium thelypteroides (Mx.) Desv.—Orient; determined by Dr. F. W. Pennell.

SPERMATOPHYTA

Picea rubens Sarg.—The young seedlings of Gid's Island were destroyed by a fire during the spring of 1922.

Potamogeton epihydrus Raf.—Laurel in shallow water; determined by Dr. Pennell.

Alopecurus aristulatus Michx.—Orient in waste places; determined by Mrs. Agnes Chase.

Danthonia compressa Austin.—Southold, common in dry woods, plants reaching 3 feet in height; determined by Mrs. Chase.

Eragrostis cilianensis (All.) Link.—Sandy cultivated fields at Bay View and Laurel; determined by Mrs. Chase and at the New York Botanical Garden. (*Eragrostis major* Host.; *E megastachya* (Koeler) Link.)

Festuca Shortii Kunth.—Wet woods, Mattituck; determined by Mrs. Chase. (*Festuca obtusa* Spreng.)

Pancium barbulatum Mx.—Southold in wet sandy soil; determined by Mrs. Chase. In the preliminary list, this was included with *Panicum microcarpon* Muhl. as *Panicum barbulatum* Nash. Mrs. Chase, in her recent list, listed these plants as different species.

* The mosses were determined by Mr. G. B. Kaiser and deposited in the Herbarium of the Sullivant Moss Society; except the *Sphagnums* which were determined by Dr. A. L. Andrews.

Panicum Boscii Poir, var. *molle* (Vasey) Hitchc. & Chase.—Dry woods at Cutchogue; determined by Mrs. Chase.

Panicum pseudopubescens Nash.—Dry woods, Cutchogue; determined by Mrs. Chase.

Phalaris canariensis L.—Border of woods, Greenport (Grant Sterling); determined by Mrs. Chase.

Spartina cynosuroides (L.) Roth.—High borders of salt marshes at Bay View, plants 8 feet tall; determined by Mrs. Chase.

Spartina patens (Ait.) Muhl., var. *caespitosa* (Eaton) Hitchc.—High borders of salt marsh at Orient, in clumps, 3 feet tall; determined by Mrs. Chase.

Carex pennsylvanica Lam., var. *lucorum* (Willd.) Fernald.—Southold in dry woods, May; determined by Mr. G. P. VanEseltine.

Carex varia Muhl., var. *colorata* Bailey.—Southold in wet sandy soil, May; determined by Mr. Van Eseltine.

Scirpus campestris Britton, var. *paludosus* (A. Nels.) Fernald.—Bay View, no. 3690; determined by Dr. Pennell.

Sisyrinchium arenicola Bicknell.—Cutchogue, sandy borders of a salt marsh, common; determined by Dr. Pennell.

Habenaria ciliaris (L.) R. Br.—A colony of several dozen plants in low ground at Greenport (Grant Sterling).

Spiranthes Beckii Lindl.—Southold in sandy soil; determined by Mr. Pennell.

Ulmus americana L.—Gardiner's Island, May 6–8, 1921, in fruit; verified by Mr. Norman Taylor. The second Long Island record.

Rumex Britannica L.—Mattituck, no. 3695; determined by Dr. Pennell.

Polygonum exsertum Small.—Salt marshes, Cutchogue; determined by Dr. J. K. Small.

Kochia Scoparia (L.) Roth.—Orient, roadside and waste places; determined at the N. Y. Botanical Garden.

Oxybaphus linearis (Pursh) Robinson.—Dry sandy beaches at Orient; determined at the N. Y. Botanical Garden.

Silene conica L.—A weed in sandy fields at Laurel and Cutchogue, no. 3417; determined by Dr. Pennell, who says, "we have no specimen of this European species from the New World, nor is it included in any of our manuals."

Ranunculus repens L.—Gardiner's Island; determined by Mr. Taylor.

Akebia quintata Decaisne.—Escaped at Orient, no. 3421; determined by Dr. Pennell.

Chelidonium majus L.—Waste places in woods, Southold (Mrs. M. A. Fay).

Sisymbrium Thalianum (L.) J. Gay.—Cutchogue in sandy fields; determined at the N. Y. Botanical Garden.

Ribes Grossularia L.—Dry woods, Laurel; determined at the N. Y. Botanical Garden.

Agrimonia striata Mx.—Greenport in dry woods; determined at the N. Y. Botanical Garden.

Crataegus macrosperma Ashe.—Orient in low woods; determined by Mr. W. W. Eggleston.

Crataegus pruinosa (Wendl.) K. Koch.—Several small trees in dry woods at Greenport; determined by Mr. Eggleston.

Crataegus straminea Beadle.—Orient in low woods, near salt marsh; determined by Mr. Eggleston. (*Crataegus intricata* Sarg.)

Rubus argutus Link.—Orient in low woods; determined at the N. Y. Botanical Garden.

Rubus Enslenii Tratt.—Mattituck in hilly woods; determined at the N. Y. Botanical Garden.

Rubus nigricans Rydb.—Southold in sandy soil, plants spreading on the ground in open fields; determined by Dr. P. A. Rydberg.

Cassia Chamaecrista L.—Southold, August 1914 (H. E. Gordon); in the Herbarium of the N. Y. State College of Agriculture at Ithaca.

Desmodium laevigatum (Nutt.) DC.—Dry woods, Southold; determined at the Bureau of Plant Industry, Washington.

Lespedeza repens (L.) Bart.—Southold in dry woods.

Oxalis corniculata L.—Orient in rich woods, plants reaching 2 feet in height; determined by Dr. Pennell as *Oxalis cymosa* Small.

Ilex verticillata (L.) Gray.—Specimens showing the variability of the species; determined by Dr. Pennell.

Evonymus europaeus L.—East Marion, border of woods and roadside (Mabel Wiggins); verified at the N. Y. Botanical Garden.

Hypericum boreale (Britton) Bicknell.—Gardiner's Island, no. 3869, rare; determined by Dr. Pennell.

Helianthemum dumosum (Bickn.) Fernald.—Dry open woods, Southold and Cutchogue, no. 4056. Dr. Pennell says, "a species characteristic of Nantucket and the Cape Cod country, but of which yours is our first specimen from Long Island."

Lechea minor L.—Cutchogue and Southold in dry woods; determined by Dr. Pennell.

Coelopleurum actaeifolium (Mx.) Coult. & Rose.—Dry hills facing the Sound, Orient and East Marion; determined by Dr. J. N. Rose. Mr. Latham wrote Dr. Rose, April 1921, as follows. "The specimens were not very good as they were taken late in December while collecting birds. The plants were quite common along the top of the Sound bank in high rocky dry ground. At that date, the basal leaves were green, and the dry fruiting stalks were from 4–6 feet high. It was a stout plant. *Ligusticum scoticum* is a very common plant at the borders of salt marshes in Orient. It is different from this plant; it is not as stout, nor so tall and never grows in such high dry grounds." Mr. Latham again collected it in June 1921, and wrote Dr. Rose as follows. "I am sending you today specimens collected the past summer at Orient. There is quite a colony of this species growing on a high bank of the Sound coast and about three miles east another small colony on a low beach between the Sound and Bay." Dr. A. W. Evans in Torreya, June 1917, reported *Coelopleurum actaeifolium* from Fisher's Island, the only other station known further south than Nantucket, Massachusetts.

Cornus alternifolia L. f.—Gardiner's Island, probably introduced; determined by Dr. Pennell.

Hypopitys insignata Bicknell.—Frequent in rich woods at Greenport, Southold, Peconic and Cutchogue. Plants highly colored, red or crimson. Dr. Pennell says: "This bright-flowered plant of the early fall was described in the Torreya Bulletin for August 1914, from Martha's Vineyard; it is certainly a brilliant species."

Vaccinium vacillans Kalm, var. *crinitum* Fernald.—Dry woods, Laurel; determined by Dr. Pennell.

Buddleia Davidii Franch.—Escaped, border of swamp at Southold; determined at the N. Y. Botanical Garden.

Lamium purpureum L.—Orient in cultivated fields and waste places; determined at N. Y. Botanical Garden.

Monarda fistulosa L.—Orient in rich woods.

Salvia pratensis L.—In fields and pastures at Orient, frequent before the war, now disappearing with the plowing of old fields. No. 3422. Determined by Dr. Pennell, who says, "Your plant is smaller-flowered than any of our eastern specimens; but I think it must be a form of this species."

Satureja vulgaris (L.) Fritsch.—Southold, roadsides, rare (Mrs. F. R. Mitchell); Gardiner s Island (E. S. Miller), reported as *Calamintha Clinopodium* Benth., in Bull. Torr. Bot. Club **7**: 18. Feb. 1880.

Veronica americana Schwein.—Greenport in wet woods; determined at N. Y. Botanical Garden.

Hieracium praealtum Vill.—Sandy beaches at Orient, rare; determined at N. Y. Botanical Garden.

Hieracium pratense Tausch.—Greenport in fields; determined at N. Y. Botanical Garden.

Prenanthes altissima L.—Mattituck in dry woods and sandy beaches; determined at N. Y. Botanical Garden.

Achillea Ptarmica L.—Orient in fields and waste places; determined by Dr. Pennell.

Aster Schreberi Nees.—Dry woods, Southold, basal leaves reaching 8 inches in length; determined by Dr. Pennell.

Centaurea cineraria L.—Waste places, rare, Orient; determined at N. Y. Botanical Garden. (*Centaurea candidissima* Lam.)

Centaurea paniculata L.—Roadsides, locally common, Bay View; determined at N. Y. Botanical Garden.

Chrysanthemum Parthenium (L.) Bernh.—Occasional in waste places and fields.

Coreopsis lanceolata L.— Southold in dry pastures, a rare escape; determined at N. Y. Botanical Garden.

Eupatorium urticaefolium Reichard.—Dry woods, Southold; determined by Dr. Pennell.

Helenium nudiflorum Nutt.—Sandy swamp at Southold; determined at N. Y. Botanical Garden.

Solidago puberula Nutt.—Dry open woods at Laurel; determined at N. Y. Botanical Garden.

The total number of species recorded in the preliminary, the first, the second and the third supplementary lists is 2461.

The number of Insect Galls, 93; Slimemolds, 15; Algae, 101; Fungi, 813; Lichens, 126; Hepatics, 31; Mosses, 106; Ferns, 36; Flowering Plants, 1130.

SHORTER NOTES

Passaic County, N. J.

On September 22nd a rapid exploration was made by me in the town of Butler in the vicinity of Star Lake; and, at intervals of about three weeks, short trips were made to Boardville and Pompton Lakes. The greatest distance between any two of these places is not more than six miles, the rock formation is the same in all and the general configuration of the land is similar. Certain differences and resemblances in the flora are noteworthy. The natural conditions have been modified most near Pompton Lakes and least in the vicinity of Boardville.

Six species of orchids in all were found in the three localities, though *Corallorrhiza maculata* was the only one seen in each of them. *Cypripedium acaule* and *Peramium pubescens* were found at Butler and at Boardville only, *Corallorrhiza odontorhiza*, at Butler only. The smaller coral root was decidedly more frequent at Butler than *C. maculata*, which is unusual so far as my observation goes. The Peramium is well established near Boardville and rather widely scattered. Many of the plants are young. At Star Lake only one plant was seen. Precisely the opposite is true of the prevalence of *Cypripedium acaule* in these two places.

Near both Butler and Boardville many beautiful plants were seen of the rose-colored form of Hypopitys.

In the clefts of rocks on the northeast side of a cliff near Boardville are some small colonies of *Woodsia ilvensis* (L.) R. Br. *Ionactis linariifolius* (L.) Greene is frequent at Boardville and Butler. In an old woodroad in a sunny spot near Boardville, is a small colony of *Gentiana quinquefolia* L.

Special attention was given to the two species of Chimaphila in order to test the statement in Taylor's Flora that *C. corymbosa* Pursh is "less common" than *C. maculata* (L.) Pursh. The statement was found to be emphatically true in two of the

localities visited, but near Pompton Lakes only one plant of *C. maculata* was observed and a large and flourishing colony was found of *C. corymbosa*, on one of the ridges, in an open, much-frequented wood, near camping places.

Just outside the village of Ramsey in Bergen County, is a low wood in which *Lycopodium lucidulum* Mx. is very abundant and near by a swamp that is possessed by Equisetum and Symplocarpus.

There are some advantages in botanizing in the early autumn, before the leaves have fallen too abundantly, for the decay and shriveling of many herbs makes it easier to detect some species that are wont to hide.—H. M. DENSLOW.

A Mid-Devonian Callixylon; by C. J. Hylander, Amer. Jour. Sci., Vol. IV, Oct., 1922, pp. 315–321, with 6 figs. in text.

Describes a new species of petrified wood from the Hamilton of Eighteen Mile Creek, western New York. Pit grouping on the radical tracheidal walls in series, determines the reference to Callixylon, a genus established by Zalessky for wood with the grouped pits from the Upper Devonian of the Province of Ekaterinoslav, Russia. As the Russian stems retain primary xylem strands or old cryptogamic wood next the pith they may at once be included in the Pityæ.

American forms are arbitrarily referred to Callixylon, since the inner limits of the secondary wood have not been seen. But as no new generic feature appears, inclusion in any other Cordaitalean genus would be unsatisfactory.

Three American species with the grouped pits are cited; whence the Callixylon type of secondary wood marks certain widespread forest forming elements of the mid to Upper Devonian, and may extend into the Carboniferous, as follows:

Callixylon	Trifilievi	Upper Devonian	Russia.
"	Oweni	" "	Indiana.
"	Newberryi	Mid-Devonian to Lower Carboniferous,	Ohio.
"	Marshii	Mid-Devonian	New York.

Thin growth rings are observed in the new Callixylon, and such hence persisted from mid to late Devonian time, having the same development in *C. Oweni*. These rings are not held to indicate as sharp seasonal change as those of existent plants. But, scant attention has been given the fact that in old and

simpler woods growth rings do not become a fixed or structural feature. The simpler type of growth ring occurs in both the Mesozoic and recent cycads, and Chamberlain finds rings in a monocotyl. Accentuation of growth ring must at first have gone on very slowly as measured by geologic periods, and is mainly correlated with the more marked tracheid and wood ray differentiation of mid to later Mesozoic time.—G. R. Wieland.

BOOK REVIEWS

Chase's First Book of Grasses*

The increasing disposition among beginning students in botany to select the grasses as a special field of study will no longer be hampered by the lack of an adequate hand-book. Mrs. Chase has demonstrated, contrary to the practice of the ordinary "How To Know" botanical literature, that scientific method need not be sacrificed in order to make the subject attractive to the beginner. From the beginning she urges the student to study the grasses themselves; but as these cannot be provided in a book, a series of careful drawings, purposedly somewhat diagrammatic, is furnished. The student is made clearly to understand that the classification of grasses is based on the *spikelet*, and the first lessons are therefore devoted to a careful study of the general structure of the theoretical spikelet. From this *generalized* spikelet the author passes to a study of its actual modifications in the order of increasing complexity. Beginning with the *pedicelled* spikelet having more than one floret as approximating most closely to the ideal diagrammatic form, we pass from the simplest type as shown in *Bromus* through the best-known typical genera of the tribe Festuceae to the most complex modification of the type in *Scleropogon*. The returning to the simple spikelet illustrated in *Bromus*, a fresh start is made along another line of differentiation, which leads us from the simplest type of *sessile* spikelet in a two-sided spike as shown in *Agropyron* through the various modifications of spicate inflorescence to its greatest complexity in *Hordeum*. The progressive development of the spikelet with more than

* Chase, Agnes. A First Book of Grasses. Pp. 121, 94 figs. New York, The Macmillan Co. 1922. $1.00.

one floret is then followed through the Aveneae, after which we pass to the pedicelled *one*-flowered spikelet as illustrated in the Agrostideae; thence to the sessile spikelet in the one-flowered spike of the Chlorideae, and finally to the highly specialized structures of Mazieae, Phalarideae, Oryzeae and Zizanieae. After thus completing the series Poateae, the more complex Panicateae are taken up in the same order, beginning with the single fertile floret of the Paniceae, and passing through the paired spikelets of Andropogoneae to the highly complicated inflorescence of Tripsaceae. The primary characters of the tribes are then summed up in a key, in which the spikelet and inflorescence of each tribe are illustrated by a careful diagrammatic drawing.

The order and relation of the tribes is that followed by Hitchcock in his recent Genera of Grasses of the United States,* but no attempt is made to invade the debatable ground of tribal phylogeny. A selected bibliography, together with some observations on botanical nomenclature and the general principles of taxonomy, closes the book.

The volume forms one of the Rural Text-Book Series under the general editorship of Dr. L. H. Bailey—a series in which the grasses have already been treated in Hitchcock's Text-Book of Grasses (1914), to which the present work will form an excellent introduction.

The drawings have been clearly and accurately made, and have been carefully reproduced. The typography is clear and attractive, and the proof-reading has been done with the most scrupulous care. In fig. 50 on p. 57 the letters A. and B in the legend have been inadvertently transposed. The book as a whole is thoroughly sound in its pedagogy, and will start the beginner on a road from which it will never be necessary for him to deviate, however far he may advance in his study of agrostology.—James C. Nelson.

* U. S. Dept. Agric. Bull. 772. 1920.

Trees of New York State*

This bulletin on the trees of New York, though dated 1921, was not ready for distribution till the fall of 1922. After an introduction giving in simple language some idea of classification and nomenclature, descriptions of leaf forms, flowers, fruits, twig characters, etc., there follow three keys to the trees, one based on leaves, one on fruits and one on winter twigs. These keys are simple and with the aid of the glossary at the end of the bulletin should be easily followed by the novice. The twig key will present a few difficulties, especially if lower branches with small buds be used. The elms can only be reached by admitting that the leaf scars are not in ½ phyllotaxy, the maples when four or more pairs of bud scales are found on the axillary buds. There follow descriptions of 133 trees, of which 109 are native, the others naturalized. Ordinary ornamental and fruit trees commonly cultivated are not given. In each case the description gives the habit, leaf, flower and fruit characters, winter characters, habitat, range in North America, distribution in New York and uses. For each tree described there is a full page plate showing in outline drawings details of the leaves, twigs, flowers and fruits. It is to be regretted that the twig drawings are in most cases too small and indefinitely drawn to be of use in identification. The descriptions are brief but concise and should make the determination of the various trees as certain as can be done. Next there is a conspectus of the families and genera with keys to the species. Then an account of tree zones and tree distribution in New York, the zones being the same as those given by Bray in the Development of the Vegetation of New York. The final chapter is an especially interesting one on the derivation of the names of trees, giving the derivations of both common and scientific names.

The bulletin makes no attempt to describe shrubs but includes many forms that only occasionally become trees, such as mountain laurel, rhododendron, dwarf sumach and nannyberry. The genus *Crataegus* is omitted except for the one species *C. pedicellata.*

*Trees of New York State, Native and Naturalized. H. P. Brown. Technical Publication No. 15, The New York State College of Forestry, Syracuse University, February 1921, 401 pages, 133 plates.

While of most direct value to foresters and forestry students the bulletin is published for the people of the state and should be of great value to all who are interested in plants and trees. —G. T. Hastings.

PROCEEDINGS OF THE CLUB

Meeting of January 9, 1923

The meeting of the above date was held at the American Museum of Natural History.

The following new members were elected:

Mr. Arthur W. Carpenter, New York City.

Mr. Carlos E. Chardon, Experiment Station, Rio Piedras, Porto Rico.

Dr. L. H. Jaffe, Montefiore Hospital, New York City.

Mr. H. A. Karling, Dept. of Botany, Columbia Univ., New York City.

Mr. Eduardo Quisumbing, College of Agriculture, Los Baños, P. I.

Dr. David Seecof, Montefiore Hospital, New York City.

The Secretary, Dr. M. A. Howe, reported the total attendance at meetings of the Club for 1922, was 357, an average of 25.5 persons per meeting. The present membership, not including those elected at the present meeting and three elected in 1922, but not yet qualified, is 284. 25 new members were elected in 1922. Only 6 were lost, 2 by death, 2 by resignation, and 2 being dropped for non-payment of dues.

The Treasurer, Dr. F. J. Seaver, reported gross receipts of $4315.37, including balance of $139.77 brought over from 1921, but not including $978.88 from the estate of Mary S. Andrews, which was assigned to the Endowment Fund. Disbursements amounted to $3936.12, leaving a cash balance of $379.45 The Endowment Fund now amounts to $3,536.58, distributed as follows: Underwood Fund, $1,974.82; Andrews Fund, $978.88; Buchanan Fund, $582.88.

The Editor, Prof. Alexander W. Evans, reported that volume 49 of the *Bulletin* contains 408 pages and 17 plates.

The Editor of Torreya, Mr. George T. Hastings, reported the publication of six bi-monthly numbers, aggregating 115

pages. He appealed for more short articles on the local flora more news items, etc.

Dr. Michael Levine, Business Manager, reported a gratifying increase in the amount of advertising and a high degree of success in stimulating payment of dues in arrears.

The Rev. Dr. H. M. Denslow, Honorary Custodian of the Local Herbarium appointed by the N. Y. Botanical Garden, stated that about 300 sheets of specimens illustrating the local flora had been contributed by Mr. W. C. Ferguson of Hempstead and about 325 specimens had been added from collections made during the year by Mr. Beals in the northern Catskills and in southern New Jersey and by the Custodian in Passaic Co., N. J., and in Rockland, Ulster, and Orange counties, N. Y. With the assistance of Mrs. Wm. Mitchell, the many thousand sheets of the Local Herbarium are being rearranged according to geographical distribution in the 61 counties included in the local flora area.

The chairman of the Field Committee, Mr. A. T. Beals, reported that of thirty announced field meetings all but two were carried out as planned, with an average attendance of twelve.

Dr. N. L. Britton, chairman of the Local Committee, reported that the time seemed opportune for compiling lists of the local plants of groups below the spermatophytes and pteridophytes as well as for revising the published lists of plants of these higher groups. It was voted that this matter be referred to the Local Flora Committee for action.

Officers were elected, the list being given on the second cover page of this issue.

Dr. N. L. Britton proposed in writing amendments to the Constitution and By-Laws, as follows: (a) To substitute the word Bibliographer for the word Librarian in Article III of the Constitution and in Article VII of the By-Laws.

(b) To make Article X of the Constitution read "The duties of the Bibliographer shall be such as may be assigned by the Club from time to time."

The proposed amendment was referred to a committee consisting of Dr. J. H. Barnhart and Dr. John K. Small for consideration and report at the next meeting of the Club.

Marshall A. Howe,
Secretary.

Meeting of January 31, 1923.

The meeting of the above date was held in the Morphological Laboratory of The New York Botanical Garden.

The amendments to the Constitution and By-Laws proposed by Dr. Britton at the last meeting and recorded in the minutes of that meeting were adopted. It was voted that the duty of the Bibliographer should be the preparation of the copy for the Index to Recent Literature, published by the Club. Miss Hester M. Rusk was elected Bibliographer.

Two new members were elected, Miss Ruth A. Connolly, New York City, and Donald Culross Peattie, Plant Introduction Gardens, Miami, Florida.

It was voted that the restrictions as to the number of pages to be printed in the *Bulletin* and *Torreya* for 1923 should remain the same as for the past year.

The first paper on the scientific program was by Dr. A. H. Graves on "The *Melanconium* Disease of Butternut."

This disease is one of the chief troubles of the butternut (*Juglans cinerea* L.). The Japanese walnut (*J. Sieboldiana* Maxim.) is also particularly susceptible. Inoculation experiments, carried on for more than four years, have demonstrated conclusively that the fungus is a weak parasite. Entering usually through small twigs, the mycelium grows slowly down through the wood—faster if the tree is already weakened—to the main branch and finally to the trunk. Ordinarily the progress of the disease is so slow that the leaves fall off one by one, not producing any striking wilting or blighting effects. In the final stages, the affected trees have a marked stag-headed aspect. Diseased branches should be pruned off promptly some distance below the apparent affection and the wounds tarred over or painted. After the fungus has penetrated the trunk there is no efficacious remedy.

The second paper was by Mr. Kenneth R. Boynton, his subject being "Some Succulent Groundsels."

Since the 16th century, the group of Senecios or groundsels known as Kleinias have been cultivated in the larger collections of succulents. They were introduced from South Africa, where they are found most abundantly in the "Karroo" vegetation, made up of plants of a xerophytic character, inhabiting a region of infrequent rains and drying winds. Two main types are

found, the stem succulents with thickened jointed stems and insignificant leaves, and the leaf succulents, with turgid brittle leaves of cylindric pointed contour. There are perhaps seven species of the former type, including *Kleinia anteuphorbia* whose succulent branches get to be nearly an inch thick, and ten species of the latter type, including the creeping sorts with short curved leaves scarcely an inch long but almost half an inch thick, such as *Kleinia radicans* and *K. divaricata*, and *K. chordifolia*, with onion-like leaves up to 8 inches long. The Kleinias are associated in their natural habitat with the cactus-like spurges, the Mesembryanthemums, and the Stapelias. Eastward and northward in Africa they are represented by five species nearly related to the Notonias of India and characterized by somewhat fleshy but broader leaves and showier flowers. The talk was illustrated by living specimens from the greenhouses of the New York Botanical Garden.

Marshall A. Howe,
Secretary.

Meeting of February 13, 1923.

The meeting of the above date was held at the Museum of Natural History.

The program of the evening consisted of an illustrated lecture entitled "A Summer in the Colombian Andes" by Dr. Tracy E. Hazen. Dr. Hazen's interesting talk was based upon personal experiences during the summer of 1922. A sketch of his itinerary and brief descriptions of some of the more striking features of the flora of the region visited were given, without lantern slides, at the meeting of the Club held on October 11, 1922, and appear in the published minutes of that date.

Marshall A. Howe,
Secretary.

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THE FLORAL ALPHABET OF THE CELTS

By Ivar Tidestrom

In an address given before the Botanical and Biological Societies of Washington the writer showed that a number of plant species, for example *Arctostaphylos unedo* and *Erica mediterranea* (Mediterranean heath) range from the north-African plateau northward to southwestern Ireland, and that the Iberian flora, properly speaking, ends in Ireland. Attention was also called to the fact that the plants in question are absent from Great Britain proper. Zoological records also indicate a similar boundary separating Erin from Great Britain.[1] Ethnology, however, cannot produce any such line of cleavage, for the "Celtic"[2] stock is readily recognized and identifiable throughout Great Britain, France, and Spain, not to mention Ireland itself. Celtic dialects, moreover, still survive, though in altered form, in Galicia, Brittany, Ireland, Wales and Scotland.

Wishing to clear up, if possible, the origin of certain very old words in my mother tongue, the Swedish language, I was led into the study and exploration, so to speak, of the Celtic field. The Celtic alphabet itself was truly a revelation; the poetic Celt had a floral alphabet all his own, nearly all of his letters were named for trees or shrubs, and his very life may be said to have been wrapped up with a sort of primitive botany. The letters of other languages,—Hebrew and Scandinavian for example, were originally symbols of surrounding objects or names of deities. The Celt alone confined his alphabetic symbolism almost entirely to the plant world.

We are wont to designate as "dark ages" those days when an insignificant fraction of the human race was literate, and modern times as the age of light. We hold ourselves immeas-

[1] For a detailed account of the Iberian elements in the Irish flora see Praeger's "Tourist Flora of Southwestern Ireland."

[2] The word "Celtic" is used throughout this paper in the commonly accepted sense, *i. e.*, applying to the Gaelic inhabitants of the British Islands and France.

urably above our heathen forefathers, both as to intellect and civilization. *But*, how many of the mechanics of our day have either the patience or the ability to fashion the implements that were used by our forefathers? How many (the birdmen excepted) would risk the elements on the high seas in small crafts as did the Viking, the "Celt," or the Phoenician of old? Truly, the human race has advanced immensely in certain directions, and relapsed in others, but the *intellects* of antiquity were fully equal to those of today. It was the vision and vivid imagination of the ancients, that led them to high endeavors whereof no feat stands out in more shining glory than their development of astronomy. The high type of intelligence of our prehistoric forefathers is amply proved by the invention of their respective alphabets. The untutored, uninitiated multitudes of those days referred to the writings of their own leaders or bards as *runes*. "Rune" is a truly "Celtic" word and is still in present day dictionaries. In Welsh it is called *rhin*. It has several meanings as: Secret, mystery, deceit, craft, subtlety; a purpose, design, intention, etc. We are wont to apply this word to the Norse alphabet. It is one of hundreds of words that have survived in the Scandinavian dialects from pre-historic Celtic times, for the Scandinavians received them from their old friends, the Gauls. That even the Latin language rests in part upon a Celtic substratum is indisputable. The same reasoning applies to the old Norse language and its derivative, the English. Therefore, the Celtic language and its lore are, to a great extent, our own, and their cultivation and preservation is a duty devolved upon us,—a duty which should be much more precious since it would tend to establish an unbreakable intellectual entente between kin now separated into distinct linguistic groups: The Romance, the Anglo-Saxon, and the Scandinavian.

To return to a consideration of common factors of the various centers of European civilization, we meet with the alphabet of the Celt, the alphabet of one of the oldest languages of Europe.

The first letter of the Celtic alphabet (as will be seen in the following figure) is *ailm*, or "A." Although *ailm* has been associated by some with the pine or palm there is stronger philologic ground for deeming the word as signifying the Wych elm (*Ulmus montana*), *ailm* thus being cognate with English

elm and Latin *Ulmus.* Furthermore, the pine and the palm are called *giubhas* and *pailm*, respectively, in the Irish language. In Italy, the native elm (*Ulmus montana*) bears a number of vernacular names of which *ulem* is the most significant. The range of this tree seems to coincide with or somewhat exceed the limits of the old Celtic dominions.

COMPARISON OF ALPHABETS AND VERNACULAR NAMES

LETTERS	GAELIC (IRISH)		ENGLISH	ANGLO-SAXON	RUNES	OLD NORSE	SWEDISH	LATIN
A	A	Ailm	Elm	Elm		Almr	Alm	Ulmus
B	b	Beith	Birch	Beorc	ᛒ	Biork	Bjork	Betula
C	c	Coll	Hazel	Haesel	ᚷ	Hastl	Hassel	Corylus
D	d	Dair Darrach	Oak	Ac		Eik	Ek	Quercus
E	e	Eadha	Aspen	Aesp		Osp	Asp	Populus
F	f	Fearn Fearnog	Alder	Alr		Alri	Al	Alnus
G	g	Gort	Ivy	Ifig		Bergfletter	Murgrona	Hedera
H	h	Uath	Hawthorn	Haguthorn		Hagthorn	Hagtorn	Crataegus
I	i	Ioda Ieo	Yew	Iw Ieow		Yr	Id Id gran	Taxus
L	l	Luis	Rowan Quicken-tree	Cuic treow		Reynir	Ronn	Sorbus aucuparia
M	m	Muin	Vine	Winbeam		Vinetrae	Vinranka	Vitis
N	n	Nuin	Ash	Aesc		Askr	Ask	Fraxinus
O	o	Oir	Spindle-tree	—		—	Spindeltrad	Euonymus
P	p	Peith-bog	—	—		—	—	—
R	R r	Ruis	Elder	Hylder Ellen		Hyll	Flader Hyll	Sambucus
S	S s	Sail Suil Seilach	Sallow Willow	Sealh Welig		Selja	Salg Vide	Salix
T	t	Teine	Fire Furze	Fyrs		—	Gul-torne	Ulex
U	u	Ur	—	—		Yr	Id-gran	Taxus

Of the plant names beginning with the initial letter, *Abhal*, the apple tree, is very striking. In Sweden, the word *Apel* is used in the various provinces by the peasantry to denote the apple tree, the word *äppletråd* being confined mostly to the books.

The most striking word perhaps in modern Irish, if we may be allowed to digress a little, is one of the words for the Deity, *Aos* or *Aosar.* In Scandinavian, this very word *As* (*Aos*) and *asar* (*aosar*) is still applied to the first *God* of the old Norsemen and his associates, *i. e.*, to Odin, Thor, Frey, etc., the mythological first kings of Sweden. Is this word of Celtic origin, or

did the "Black Gentiles," as the Danes were called by the pagan Irish, introduce it into Ireland?

The letter B, *beta* in Greek and *beth* in Hebrew, is *beith* in Celtic, and is said to have stood for the birch, *Betula*,—most probably the common European birch (*Betula alba*) which is frequent on heaths, in woods, and mountain glens. This tree has nearly the same range of distribution as the European elm (*Ulmus montana*) and is consequently another tree of the old Celtic world. One of their most useful and ornamental trees, the birch entered into the fundamentals of the old Norsemen, since the letter B stands for *bjärkan* or *björk*, the birch, with them also.

There are a number of vernacular plant names in Irish beginning with the letter B, of which the following are the most noteworthy: *Beath* or *beathog*, the beech (*Fagus sylvatica*) was also known as *Beith na measa* or the "birch with the acorns." If we start somewhere in Sweden in the latitude of Stockholm (59° North) and travel southward, we traverse forest areas covered mostly with spruce, pine, or birch, and after having reached southern Sweden we enter the dominion of the beech which becomes the prominent species, contesting with the oak the first place among trees. The birch preferring the cooler regions becomes rarer on the lowlands as we continue southward. It is possible, therefore, that the old Celtic bards meant to honor the beech or *beith na measa*, rather than the rare mountain-loving birch, the *beith*. This view is the more probable if we consider the name of the old Irish alphabet, *Beath-luis-nion*, which translated into our language becomes "beech-quicken tree-ash." In this old Irish alphabet the first three letters were B, L, and N. The modern sequence of letters, beginning with *ailm* ("a"), was initiated by St. Patrick. This renowned man it will be of interest to recall was nicknamed by the Irish people *babloir*, *i. e.*, the talker,—literally prater or babbler. *Barbog*, or slender point, is the name for barberry bush. *Bealteine*, meaning Baal-fires, was the name given by the heathen Celt to Mayday in honor of the god Beal. The latter name brings us back to Old Testament days of Baal.

The letter C, in the Celtic alphabet, the equivalent of the Greek *kappa* and *chi*, is *coll*, and stands for the hazel bush. In the Viking language the letter H stood for the same thing, *i. e.*, *hastl* or *hassel* (*Corylus avellana*).

The old Scandinavians held the hazel bush sacred. Their "open courts" were enclosed by rods of hazel and it was considered a desecration to break into such an enclosure. A violater of this code became an outlaw, liable to lose his life if apprehended. The women were often protected by a similar enclosure; camping grounds likewise. The swift and summary punishment meted out deterred many a one from violating the sanctity within a hazel-fence. The famous divining rods were made of hazel. The hazel bush is celebrated in song, and one of the sweetest songs of old Sweden, one which is still sung by high and low, is a dialogue between a hazel bush and a little maiden going to the spring for water. Charlemagne directed the superintendents of his numerous estates to plant hazel. During the middle ages in Sweden, no one was allowed to gather hazelnuts from another man's domain. Whoever gathered more than a mitten full was punished by a fine. The French language has two words for this bush or tree: *Noisetier* and *coudrier*, the latter being derived from *coldre* of the old French language,—and presumably a prehistoric Celtic or Gallic word. Irish literature and folk lore are full of stories involving shrubs, trees, fairies, etc.

The Irish dictionary gives a large number of plant names beginning with the letter C. *Crann* and *craobh* are the words for "a tree" and a great number of names are recorded in which, as in the Latin language, the word *crann* is the noun followed by a modifying adjective or another noun in apposition: thus, *arbor foliis tremulis* becomes *crann crith*,—the tree trembling or the quaking aspen. *Crann ola* is the olive; *crann-pion*, the piñon; and *crann pobhuil*, the poplar. *Cal* or *coilis*, cabbage, is almost identical with the Swedish word *kål* and clearly cognate with English "*cole*" (in *colewort*) and German *kohl* (as in *kohl*-rabi).

D stands for *dair* or *darrach*, the oak. The Welsh word is *dar*.

Strabo applied the word *Druidae* to the Celtic priests or rulers, the *Draothi*. It is doubtful if this word is at all related to *drus* the Greek word for oak. The Scandinavian word *Drott* was used for the Druids, and has nothing to do with the word for oak. The Celtic word is also spelled *Duir*,—a word which recalls *dur* hard, *durus* of the Latins. The original meaning of the word *drus* is tree, a meaning it had in the Sanscrit language. *Drus* may have been generally applied to the oaks by the old

Greeks, but these had other names for the various species as *balanos*, *aigilops*, *phellos*, etc. The modern Greek vernacular is *balanidia* for the species bearing edible acorns, while *phellos* is still used for the cork oak in Greece.

The Celtic name for henbane (*Hyoscyamus niger*) is *deodha*. A play on words may be permissible here, since *deodh* means *everlasting*, for whoever becomes too intimate with this plant might experience a sudden awakening in eternity!

E, or *eadhadh*, is the aspen (*Populus tremula*).

F, or *fearn*, is the alder (*Alnus glutinosa*). This word is still alive under the form *vergne* in France.

Under F are found a number of interesting Celtic words, as *fem*, woman, *frag*, also a woman or wife,—a word which recalls the German word *frau*. *Fuirneis* means furnace or stove, and *fuirne*, "THE BIG STOVE"! ! Attention might be called here to the fact that the Scandinavians dedicated their letter "F" to the peace god, Frey.

G, or *gort*, is *Hedera helix*, the ivy. The word has also another meaning as: garden, standing corn, a field. In the latter sense this word appears under many forms from *hortus* of the Romans to *gärd* of the Swedes. The original application of the word *gort* has been lost.

Gairleog is garlic (*Allium sativum*). This word is said to be derived from the old Norse word *geir-laukr*. The plant, however, is native of Asia but this fact does not conflict with the name's being of Scandinavian or Gothic origin, for the daring Lords of the High Seas roamed everywhere.

Gasun, young boy, or *garçon* in French and, in Old English, *gossoon*, appears to be another word surviving from ancient Gallic times. Unlike the Irish language which survived, the vocabulary of Old Gaul became incorporated more or less into the resultant Gallo-Latin tongue, now the modern French.

Giubhas is the Celtic word for fir; it recalls the Latin word *Abies*, a probable derivative, since the common European silver fir (*Abies pectinata*) is a native of the old Celtic domain, including northern Italy. The Celtic dominions adjoined Macedonia at the time of Alexander the Great. The people therefore lived right within the range of the fir and this prominent species did not escape the observant Celt.

Guis, the mistletoe, was Latinized by the Romans into *Viscum*. I is *iodha*, the yew tree. The name appears under different forms as: *Iubar* and *iur*. The Celts seem to have recognized the relationship of the yew to the juniper, which fact is disclosed in the names given to these plants: *Iubar* is the yew and *iubar beinne* or *iubar creige*, the yew of the hill-top or crag, *i. e.*, the juniper. Both plants have the same range and practically the same habitat, although the yew prefers the beech and oak forests. The word *iodha* also means grief, and since the yew was generally planted about cemeteries, the word came to be applied also to the grave. The Celtic word is still alive in Swedish in the form of *id* or *id-gran*. The latter word means yew-spruce, the word for spruce in Swedish being *gran*. The derivation of *gran* is held to be from *grön*, green. Thus the spruce is first supposed to have been called *gröne-träd*, green-tree, and later on simply *gran*. Is this view right, or is the word *gran* simply another form of the Celtic *crann*? *Crann iodha* may have been another name for the yew. An inversion of the elements into *id-gran* in Swedish is very plausible, if not ascertainable, for in the old Swedish the adjectives *followed* the modified noun as in Irish and the Romance languages, instead of preceding the noun as in English.

The juniper was also known as *jubhar talaimh*, or the yew of the ploughed land. The word *talamh* (genitive *talaimh*) is of interest to us since it is of Hebrew origin and was probably incorporated in the Celtic tongue by that colony of Celts which had emigrated to Miletus, the descendants of which later went to Ireland.

L in Celtic is *luis* and stood for the mountain ash (*Sorbus aucuparia*). The English name rowan-tree is derived from the Old Norse language. In Swedish it is *rönn*.

There are a great number of plant names beginning with L. These are made up of the words *lus* and *lusan*, meaning herb and little herb, respectively, plus a modifying adjective. Thus we have: *Lus-mor*, plant big, *i. e.*, foxglove (*Digitalis purpurea*); also applied to the common mullein (*Verbascum thapsus*); *lusan-bhall*, flower of the walls, pellitory (*Parietaria*); *lusan-baine*, milkwort (*Polygala*); *lus na miol mor*, flower of the whale (*Malva sylvestris*); *lusan airige*, noble flower, daffodil; *crom lus*, bent flower, poppy; *lus na-fola*, blood plant, shepherd's purse; *lus-na-h-ordhche*, nightshade, belladonna.

The word *blath*, meaning flower, is also used in compound words of this kind, as: *Blath-na-licuig*, the flower of the gravestones, *Iris* sp.

M is named *muin*, the vine. Under this letter we find a number of names of important economic plants. Of these names the compounds of *meacan* are the most important. The word *meacan* means root or bulb, and appears in such plant names as: *Meacan buidhe* or yellow root, the carrot; *meacan dogha*, burdock; *meacan each* horse radish *meacan righ*, king root, parsnip; *meacan ruaidh*, red root, radish.

N, named *nuin*, stood for the ash tree (*Fraxinus excelsior)*. There are a number of more modern forms of this name. There are only a few plant names under this letter. *Neep* or *neup fhiadhain*, the turnip, recalls *napus* of the old Romans or *Brassica Napus* L.

O, named *oir*, stood for the Spindle tree (*Euonymus europaeus*). Few Gaelic plant names begin with the letter O. Of these, however, the following deserves some notice: *Oirp* or *norp*, in French *orpin*, is the name for the house-leek (*Sempervivum tectorum*), a member of the Orpine family (*Crassulaceae.*)

P, named *peeth-bhog*, *i. e.*, soft B, does not stand for any plant in the Irish language. Cameron ("The Gaelic Names of Plants") assigns *peeth* to the pine (*Pinus sylvestris)*; the name for that species however, is *giumgas* in Irish (*guithas* in Scotch).

There are a number of plant names under this letter among which are: *Plur* or *flur*, a flower or blossom, of which *fluirein* is a diminutive. These words also signify flour or fine meal.

Paipin, the word for poppy, according to Cameron, is a corruption of the Latin word *Papaver*. *Paipin ruadh* is the red poppy (*Papaver rhoeas*). The juice of this plant was often put in children's food to make them sleep.—the original Mrs. Winslow's Soothing Syrup!

Paipin duhb is the black poppy (*Papaver nigrum*). The Manxmen call it *lus y chadlee*, the plant for sleep.

Papaver somniferum, the white poppy, is called *codalan* or *collaidin ban*. *Codalan* in Irish means a nap or "*somnus brevis.*"

Pacharan chapull is the bog bean (*Menyanthes trifoliata*). The leaves of this plant were formerly smoked as tobacco.

In conclusion it might be well to state that interesting as is the gateway to the Celtic Garden, *i. e.*, its alphabet, the interior

of the garden opens up wonders of beauty and quaintness undreamt of by the uninitiated. Nowhere do we find quainter and more striking music than in Ireland and nowhere do we find a greater love for and higher development of music, art, and literature than in the old Celtic dominions, *i. e.*, France, Spain, Italy and perhaps southern Germany. In the United States of America the descendants of the "Celts" are with us in large numbers and their great heritage should neither be neglected nor forgotten.

SOME RECENT EXTENSIONS OF THE KNOWN RANGE OF PINUS PALUSTRIS

Roland M. Harper

The long-leaf pine, *Pinus palustris* Mill., is such an abundant, conspicuous and unmistakable tree that its natural distribution was long ago mapped with reasonable accuracy, and no noteworthy additions to its recorded range seem to have been made since about 1880, when it was found in the mountains of Georgia and Alabama by Dr. Charles Mohr and others.* Its distribution as known 25 or 30 years ago is shown on Plate 3 of Mohr's Timber Pines of the Southern United States,† and that represents pretty well our knowledge today, except that it extends down the east coast of Florida to about latitude 28°, and eastward in Middle Georgia to within a few miles of Atlanta, and probably does not come as close to Vicksburg, Miss., as is indicated by the map.‡

A large outlying colony of this pine in the northern part of Walker County, Alabama, has been known for some years,§ and in the spring of 1922 I was informed by Mr. B. M. Luf-

* See Torreya **5**: 55. April 1905.

† U. S. Forestry Bull. 13. 1896. (Revised 1897.) As far as *Pinus palustris* is concerned this supersedes Dr. Mohr's forest maps of Alabama and Mississippi in the 9th volume of the Tenth Census, which are not very accurate.

‡ A map on page 3 of W. R. Mattoon's bulletin on long-leaf pine (U. S. Dept. Agric. Bull. 1061; dated July 29, 1922, but apparently not published until a few months later) represents it as extending over nearly all of Florida, Alabama and Louisiana and more than half of Mississippi, but that is an unwaranted exaggeration.

§ See Geol. Surv. Ala. Monog. 8: 54, 141. 1913. I have not visited that place since 1906, but a railroad has been built to it since, and doubtless much of the timber cut out.

burrow, in charge of the Alabama National Forest, in the sandstone plateau region of Lawrence and Winston Counties, that there is a good deal of it in the central part of the latter county, which adjoins Walker on the north. In April, 1922, I walked through Winston County from about the center of its northern border to Haleyville near its western edge, and although I did not see any long-leaf pine, Mr. Lufburrow's observations were confirmed by some of the natives with whom I talked.

On the front cover of the Alabama School Journal (Birmingham) for May, 1922, there is a half-tone cut of a new schoolhouse in the eastern part of Walker County, with some long-leaf pines in the background. That is several miles from any station for this tree known to botanists.

In the coastal plain of Alabama *Pinus palustris* is scattered throughout the central pine belt (Cretaceous) on the poorer soils from the eastern border of the state to about the middle of Tuscaloosa County, but it had not been recorded northwest of there. On Oct. 21, 1922, I was traveling from Fayette to Tuscaloosa, a distance of about 40 miles, by an automobile stage line recently established, and at a point estimated to be about 15 miles south-southeast of Fayette (there were no mileposts along the road) *Pinus palustris* began to appear sparingly in dry woods on sandy uplands (mapped as "Ruston fine sandy loam" in the government soil survey of Fayette County, 1920). I was assured by other passengers that this was well within Fayette County, and thus another county was added to the list of those in which it grows.

A month later I traveled southeastward from Union, Mississippi, on the Meridian & Memphis R. R. (which has been built since the publication of the government soil survey of Lauderdale County about ten years ago), and I noticed *Pinus palustris* beginning near the village of Little Rock, about six miles from Union, in Newton County, and becoming increasingly abundant from there on to Meridian. Dr. Mohr's 1896 map does not show it as occurring in Newton County or anywhere northwest of Meridian, and the northernmost station mentioned in Dr. E. N. Lowe's Flora of Mississippi* is Lost Gap, about eight miles west of Meridian; but Dr. E. W. Hilgard† put its northern

* Miss. Geol. Surv. Bull. 17. 1921.

† Geol. & Agric. Miss. 303. 1860.

limit in Mississippi at Patickfaw Creek in Kemper County, which is about the same distance north of Meridian that Little Rock is northwest.

The lumbermen saw the pine in Newton County long before I did, though, and have already cut out practically all the trees worth taking. In that part of Missisippi it seems to be almost confined to the rocky ridges of the Buhrstone formation (Eocene), locally known as mountains, which trend about northwest and southeast;* and it is very much in evidence around Lost Gap, where the Alabama & Vicksburg Ry. tunnels through the mountains (the only tunnel in Mississippi). A logging road branching off northward from the A. & V. Ry. west of the tunnel seems to have reached out to the limits of long-leaf pine in that direction even before the M. & M. R. R. was built.

In this connection an alleged outlying station for this species in Virginia that has never been verified should be mentioned. All authorities agree that *Pinus palustris* is or has been found in a few of the southeasternmost counties of Virginia, and details are given in the county descriptions in W. C. Kerr's report on cotton production, in the 6th volume of the Tenth Census, 1884 (see pages 631, 635, 637); though there seems to be no authentic record of its being seen in that state in the last thirty or forty years. Dr. F. P. Porcher, in the second edition of his "Resources of the Southern Fields and Forests," 1869, states that it occurs in Powhatan County, which is in the Piedmont region, farther north and also farther west than any of the other reported Virginia stations. But it is possible that some acquaintance of Dr. Porcher's who was familiar with *Pinus echinata* and *P. Virginiana*, the two common pines of Piedmont Virginia, was traveling southeastward and saw *Pinus Taeda* for the first time in Powhatan County, and mistook it for *P. palustris*, which he had perhaps never seen.

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* For a description of the same mountain range in Alabama see Geol. Surv. Ala. Monog. 8: 98, 99, 159. 1913; and Spec. Rep. 11: 29–30, 34. 1920.

BOOK REVIEWS

The Laramie Flora*

After many and vexatious delays, Knowlton's revision of the Laramie Flora has at last made its appearance. I saw the practically completed manuscript years ago, and it is regrettable that works of this kind cannot be issued with reasonable promptness after being submitted for publication.

Now that we have the book it is all that could be expected, forming an excellent foundation on which to build further work dealing with the fascinating problem of the uppermost Cretaceous floras, and their relation to those of the lower Teritary. The exceedingly complete historical summary shows us clearly how the essential facts, often obscured by mistakes and misunderstandings, have gradually taken shape, so that to-day it is possible to distinguish what is evidently a single flora, and discuss its characters and relationships. This flora indicates warm and moist conditions but is very different from the present neotropical region. The great representation of *Ficus*, with about 40 species is a salient feature. Stanley enumerates 23 valid species of *Ficus* from Mexico to-day, and 41 from Mexico and Central America combined, but these would not be found together in a flora as restricted as the Laramie presumably was. Berry† has lately pointed out the probability that several of the "species" of *Ficus* represent variations of a single type and has proposed to unite at least two of the Laramie species with the Eocene *F. mississippiensis* (Lesq.) Berry. This may perhaps be correct but while it is certainly true that diverse appearing leaves may even come from a single tree, it is probable on the other hand, that the Cretaceous and Eocene plants, if we knew them perfectly, would prove to be different. The subject is a large and difficult one, but we may doubtless get some light on the rate of modification of specific types, not only from fossils but also from a study of geographical distribution, particularly on islands.

Under *F. navicularis* Ckll. Knowlton remarks that it is doubtless different from *F. lanceolata* Heer of the Swiss Miocene.

* The Laramie Flora of the Denver Basin, with a Review of the Laramie Problem. F. H. Knowlton, U. S. Geological Survey, Professional paper 130. 175 pp., 28 plates. 1922.

† Additions to the Flora of the Wicox group. U. S. Geol. Survey, Prof. paper 131-A. 1922.

This must be admitted though I saw Heer's types of *lanceolata* at Zurich and they are strikingly similar to our Laramie plant from Marshall, Colo. Knowlton states that the name *navicularis* should be applied to the American species but unfortunately it was founded exclusively on Heer's plant, his name being a homonym. The Laramie plant (type from Marshall) described as *navicularis* by Knowlton may stand as **F. Knowltoni** n. n.

The cryptogamic plants are represented by quite a series of ferns, some of them striking forms, a single imperfectly known *Equisetum*, and an algal form which Lesquereux called *Delesseria fulva*. This last cannot be referred to any particular genus and should be consigned to Seward's blanket genus *Algites* or better rejected as indeterminate. Standing as a *Delesseria* it will be taken as evidence of marine conditions.

Conifers are poorly represented, doubtless owing to the conditions in the locality. The fragments of *Sequoia* etc., as the author suggests, may have been washed from higher ground. We must not forget that there was doubtless an upland flora, very distinct from that of the swampy region, of which we cannot expect to recover more than small fragments.

T. D. A. Cockerell.

VON TUBEUF: MONOGRAPHIE DER MISTEL*

It is not often that the reviewer has before him a monograph as complete in every detail as this one on the mistletoe by the author of the well-known Pflanzenkrankheiten durch kryptogam Parasiten verursacht, published in 1895. The monograph is the result of many years of study and experimentation on the part of Dr. von Tubeuf of the University of Munich, who has been ably assisted by Dr. Gustav Neckel, professor in the University of Berlin and Professor Dr. Heinrich Marzell. The book in large octavo is printed attractively on glazed paper, which allows of the reproduction of the photographs and maps in the body of the text.

*Tubeuf, Karl Freiherr von: Monographie der Mistel. Mit 5 beigehefteten lithographierten Karten und mit 35 Tafeln sowie 181 Figuren im Text. Seiten xii+832. München und Berlin, 1923. Druck und Verlag von R. Oldenberg, München, Glückstrasse 8.

After a discussion of what is understood by mistletoe, the author describes the prehistoric discoveries of mistletoe in Europe. Closely associated with these finds is the documentary evidence of the ancient knowledge of the plant among the Greeks and Romans. The mistletoe in tradition and folklore should appeal to a large circle of plant lovers. The employment of the plant as bird lime is described, as also its use as fodder by wild and domesticated cattle, and as human food. Chapter 4 is devoted to the folk and botanical names of the mistletoe. Chapter 5, pages 87–364, is occupied with a detailed consideration of the geographical distribution throughout Europe.

Part II is concerned with the Morphology, Physiology, Biology and Pathology of the mistletoe. Floral diagrams are given, the structure of the fruits and seeds is described, to which is appended an account of the teratology of the fruit and the germination of the seeds. The stem structure, branching, growth and the structure of the parasitic root system are given in the greatest detail. The chemistry of the plant is not neglected, as a section of fifteen pages considers that phase of the study. The nutrition of the plant comprises the interesting physiological part of the book, including the influence of the parasite on its host. The birds that are instrumental in the natural distribution of the plant are described and figured. Other birds and animals are described as agents of distribution,

The third part of the book deals with the role of the mistletoe in practical garden, orchard and forest operations and a list of the host plants is given. This practical part covers 109 pages of the book. Chapter 13 gives in detail Dr. von Tubeuf's experiments on the cultivation of mistletoe upon various host plants, and chapter 14 treats of the destruction and control of the plant parasite in garden, orchard and forest. It will be seen from the above brief description, that very little has been left undone in the study of this plant, which has interested mankind from the Druids down to the present day.

JOHN W. HARSHBERGER,
University of Pennsylvania.

PROCEEDINGS OF THE CLUB

Meeting of February 28, 1923

The meeting was held at the Museum of the New York Botanical Garden.

The budget committee, under the chairmanship of Dr. Barnhart, offered estimates for the year 1923.

The report of the budget committee was accepted and adopted. The resignation of Miss Hester M. Rusk as bibliographer was accepted with regret.

The first paper on the scientific program was by Dr. George M. Read on "Sorghum Smuts and their Relations to Sorghums." An abstract follows:

The sorghums are a group of important agronomic plants especially well adapted to the Great Plains area, including western Kansas, western Oklahoma, northwestern Texas, eastern New Mexico and eastern Colorado. They are annuals, belonging to the species *Holcus Sorghum* L., the wild types of which are natives of central and southern Africa. A closely related species is *Holcus halepense* L., or Johnson grass, which is perennial, and a native of southern Europe, western Asia and northern Africa.

The sorghums have been introduced into the United States from various parts of the world. The majority of them, however, including such groups as the Durra, Feterita, Milo, Kafir and most of the Sorgos, have come from Africa. The Kaoliangs have been introduced from northern China, in some sections of which they constitute a very important group of cultivated plants.

All the sorghums readily cross with one another and this in part accounts for the great diversity of the group as a whole. They are conveniently classified as follows:

1. Grass Sorghums, as Sudan Grass and Tunis Grass.

2. Broom Corn, grown extensively for the manufacture of brooms.

3. Grain Sorghums, including the diverse groups of Durra, Feterita, Milo, Kaoliang, Kafir and Shallu.

4. Sorgos, or sweet sorghums, grown mainly as forage crops and, to a less extent, for the production of sorghum syrup.

The sorghums are attacked by several different species of smuts, three of which are widely distributed and destructive. *Sphacelotheca Sorghi* (Link) Clint. is the covered kernel smut and is to be found wherever sorghums are grown. It is very destructive to the sorghum crop in India and the United States. The flowers are converted into enlarged smut balls; the spores are distributed in harvesting, threshing, and similar operations and contaminate the sound grain. Infection occurs in the seedling stage of the host by means of the seed-borne spores. *Sphacelotheca cruenta* (Kühn) Potter is the loose kernel smut of sorghum and seems to be less widely distributed and destructive than the covered kernel smut. In this disease the flowers are also converted into enlarged smut balls which break open and allow the escape of the spores. Infection seems to occur mainly by means of spores distributed on the seed. Infected plants are dwarfed and head out considerably earlier than the sound plants. The third smut is the head smut, *Sorosporium Reilianum* (Kühn) McAlpine. It is of special interest because it occurs on both maize and sorghum. It is the maize smut which regularly occurs in Australia. It is comparatively rare on this crop in the United States. In the head smut, usually the entire head or panicle is converted into a large mass of smut spores. Infection appears to take place mainly by means of spores present in the soil and not from contaminated seed.

A large number of varieties of sorghums belonging to the different groups have been tested to determine their susceptibility or resistance to the two kernel smuts. Most of the varieties have proved to be highly susceptible to both. There are, however, important exceptions; Feterita, the Milos, Dwarf Brown Kaoliang, as well as a few other varieties, have proved to be markedly resistant to both kernel smuts. The results with both smuts were quite similar, but one striking exception was observed. Darso, which is resistant to *Sphacelotheca Sorghi* has proved to be quite susceptible to *Sph. cruenta*.

The second paper was by Dr. H. A. Gleason, under the title, "Notes on British Guiana Plants". He indicated the parts of British Guiana which had received some botanical exploration and showed that most of this work had been confined to the immediate vicinity of the coast, and that few botanists had

penetrated far inland. The herbarium of the New York Botanical Garden, which recently did not contain more than 3,000 sheets from this country, has received important additions from the Jenman herbarium and from the collections of Hitchcock, Gleason, and de la Cruz, so that the number of sheets now available for study is in excess of 6,000. This is still a small representation of the flora, which is estimated to contain 6,000 species of flowering plants alone. These collections make it apparent that British Guiana still contains a very large number of undescribed species. Geographically, the province seems to comprise five zones: (1) the coastal lowlands, (2) the zone of low hills, (3) Mt. Roraima and the adjacent mountains, (4) the savanna region of the Hinterland, and (5) the range of low hills along the Brazilian border. The first three of these zones is densely wooded, the fourth is largely open grass land, and the botanical nature of the fifth is almost unknown. The chief additions to the flora are to be sought in zones three, four, and five, where numerous montane and Amazonian species are to be expected.

Adjournment followed.

MARSHALL A. HOWE,
Secretary.

Dr. A. S. Hitchcock, accompanied by his wife, left in May for South America, where he will make botanical collections. Three months will be spent in Ecuador, the work being a continuation of the co-operation between the U. S. Department of Agriculture, the Gray Herbarium, and the New York Botanical Garden in studying the botany of northern South America. About three months will be spent in Peru and Bolivia studying grasses for the Department of Agriculture.

Dr. R. M. Harper spent April and part of May in northern Arkansas making a survey for one of the larger religious denominations. Incidentally he made some botanical observations which we hope to publish before long.

TORREYA

Vol. 23 No. 4

July-August, 1923

NOTES ON THE DESMIDS OF NEW YORK

Clarence J. Hylander

During the summer and autumn of 1922, the writer was enabled to make a few collections of desmids at several localities in New York state. These collections were not particularly fruitful, and did not yield any new species, yet so little has been done on this family of plants in this state that the writer feels that there is some excuse for such a short report as this. It is hoped that this will be the first of a series of notes on the New York Desmidiaceae. For with the exceedingly varied topography, ranging from the alpine lakes of the Adirondacks to the sand hill ponds of Long Island, the desmid flora of this state ought to present a diversified and interesting assemblage of species.

Of the previous papers on the subject, we might mention two, both of which are very brief. J. W. Bailey in 1846 published an article in the American Journal of Science and Arts (II, 1: 126–127), entitled "Some new species of American Desmidiaceae from the Catskill Mountains." This contains an account of only a few species, as might be expected when one considers the state of knowledge on the Desmidiaceae at that time. The other paper is by J. A. Cushman and was published in 1903 (Bull. Torrey Club 30: 513–514),—entitled "Desmids from Bronx Park, New York." This report also is brief, although it includes a greater number of species than Bailey's report. Nineteen species are recorded, the majority of which are Closteria and Cosmaria.

Four localities, involving four separate collections, form the basis of this report. They are as follows: Sept. 29, Port Henry, Essex county, on Lake Champlain; Sept. 30, Crooked Lake, Rensselaer county, and Grafton, Rensselaer county; Nov. 20, Scarsdale, Westchester county.

1. Collection at Port Henry

The material here was collected from floating masses of weeds and Myriophyllum which formed a tangled mat entirely

covering the surface of a slightly stagnant pond. This pond was very near Lake Champlain, and evidently had been a small bay until cut off from the Lake by a railroad embankment that ran between the pond and the Lake. As a whole, due to the slightly stagnant environment, the squeezings from the material were not very rich in any sort of plankton. The following species of desmids were identified.

Closterium Ehrenbergii Menegh.—Quite common, and consisting of some extra large specimens.

Micrasterias truncata (Corda) Bréb.—Rare.

Cosmarium undulatum Corda—Rare.

Cosmarium punctulatum Bréb.—Very common.

Cosmarium triplicatum Wolle—Only one specimen found.

Staurastrum crenulatum Näg.—Common.

Staurastrum dilatatum Ehrenb. Very common. Together with the preceding species, making up most of the material.

2. Collected at Crooked Lake

This collection, more fruitful than the preceding one, was made at an inlet to Crooked Lake. The stony bottom of the clear and fresh water was covered with a dense growth of mosses. Squeezings from these mosses yielded an abundance of desmids which unfortunately consisted of a quantity of several common species, with other desmids occasional. The species were as follows:

Netrium Digitus (Erhenb.) Itzigs. & Rothe.—Occasional.

Closterium Dianae Ehrenb.—Occasional.

Closterium incurvum Bréb.—Rare.

Closterium Lunula (Müll.) Nitszch.—Occasional.

Closterium Ralfsii hybridum Rabenh.—Occasional.

Closterium Kutzingii Bréb.—Only one specimen found.

Euastrum insulare (Wittr.) Roy—Very common, and together with *C. pseudopyramidatum* making up the bulk of the material.

Euastrum bidentatum Näg.—Common.

Euastrum dubium Näg.—Rare.

Micrasterias americana (Ehrenb.) Ralfs—Rare.

Cosmarium pseudopyramidatum Lund.—Very common.

Cosmarium punctulatum Bréb.—Common.

Cosmarium Broomei Thwaites—Rare.

Cosmarium octhodes Nordst.—Rare.
Cosmarium ornatum Ralfs—Rare.
Cosmarium triplicatum Wolle—Occasional.
Cosmarium isthmium West—Only one specimen found.
Staurastrum dilatatum Ehrenb.—Rare.

Besides these desmids, the material was particularly rich in other plankton. Most numerous were *Pediastrum tetras* (Ehrenb.) Ralfs, *Pediastrum duplex* Meyen, *Sorastrum americanum* (Bohlin) Schmidle, and *Coelastrum microporum* Näg.

3. Collection at Grafton

At Grafton, the collection came from a roadside swamp, almost destitute of water, but with the pools containing submerged sphagnum scattered among the tussocks of dry grass. Squeezings from this submersed sphagnum netted the following species:

Closterium Dianae Ehrenb.—Common.
Closterium rostratum Ehrenb.—Only one specimen.
Closterium intermedium Ralfs—Common.
Closterium didymotocum Corda—Occasional.
Closteruim Lunula (Müll.) Nitzsch.—Occasional.
Pleurotaenium trabecula (Ehrenb.) Näg.—Common.
Tetmemorus Brebissonii (Menegh.) Ralfs—Rare.
Euastrum oblongum (Grev.) Ralfs—Common.
Euastrum ansatum Ralfs—Common.
Micrasterias laticeps Nordst.—Occasional.
Micrasterias truncata (Corda) Bréb.—Rare.
Micrasterias radiata Hass.—Very abundant.
Micrasterias denticulata Bréb.—Common.
Micrasterias rotata (Grev.) Ralfs—Rare.
Cosmarium pseudoconnatum Nordst.—Occasional.
Cosmarium pseudopyramidatum Lund.—Common.
Cosmarium moniliforme Ralfs.—Rare.
Cosmarium contractum Kirch.—Rare.
Cosmarium ovale Ralfs—Very abundant and consisting of excellent specimens.
Staurastrum crenulatum Näg.—Common.
Hyalotheca dissiliens (Smith) Bréb.—Rare.

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Euastrum dubium Näg.—Rare.

Micrasterias americana (Ehrenb.) Ralfs—Rare.

Cosmarium pseudopyramidatum Lund.—Very common.

Cosmarium punctulatum Bréb.—Common.

Cosmarium Broomei Thwaites—Rare.

Cosmarium octhodes Nordst.—Rare.
Cosmarium ornatum Ralfs—Rare.
Cosmarium triplicatum Wolle—Occasional.
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Cosmarium pseudoconnatum Nordst.—Occasional.
Cosmarium pseudopyramidatum Lund.—Common.
Cosmarium moniliforme Ralfs.—Rare.
Cosmarium contractum Kirch.—Rare.
Cosmarium ovale Ralfs—Very abundant and consisting of excellent specimens.
Staurastrum crenulatum Näg.—Common.
Hyalotheca dissiliens (Smith) Bréb.—Rare.

4. Collection at Scarsdale

This material is interesting because the collection was made after a thin sheet of ice had commenced to form over the water. Although thus quite late in the season, a considerable desmid flora was found, which consisted mainly of Closteria. The material was secured from the sediment at the bottom of a shallow pond near the Bronx River Parkway. The following species were identified:

Penium margaritaceum (Ehrenb.) Bréb.—Only one specimen.
Closterium acutum (Lyng.) Bréb.—Rare.
Closterium abruptum West—Rare.
Closterium Dianae Ehrenb.—Common.
Closterium Cynthia DeNot—Very common.
Closterium didymotocum Corda—Abundant.
Closterium Ehrenbergii Menegh.—Common.
Closterium Lunula (Müll.) Nitzsch.—Common.
Closterium moniliferum (Bory) Ehrenb.—Abundant.
Closterium tumidum Johnson—Rare.
Pleurotaenium truncatum (Bréb.) Näg.—Common.
Euastrum ansatum Ralfs—Rare.
Euastrum bidentatum Näg.—Rare.
Euastrum oblongum (Grev.) Ralfs—Only one specimen.
Cosmarium moniliforme Ralfs—Rare.
Cosmarium octhodes Nordst—Rare.
Cosmarium punctulatum Bréb.—Rare.
Cosmarium repandum minor West & G. S. West—Rare.
Cosmarium undulatum Corda—Occasional.
Arthrodesmus covergens Ehrenb.—Only one specimen.
Staurastrum crenulatum Näg.—Only one specimen.

The preceding report includes 50 species of desmids, of which there are 15 Cosmaria, 14 Closteria, 6 Micrasterias and 5 Euastra.

Hartsdale, N. Y.

ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1922

JAMES C. NELSON

The outstanding feature of the past season's collecting in this region has been the number of new species afforded by the river-shores. It is not specially surprising to find species of the interior basin along the shores of the Columbia about Portland, brought down during the annual inundation; but it is much more difficult to explain the frequent occurrence of introduced species along the Willamette and its tributaries. These rivers rise in mountainous and sparsely-settled regions where the flora is strictly indigenous; and the foreign species occurring so abundantly along their shores are usually never found about the towns along the banks. Here at Salem we have a very distinct riparian flora, largely made up of introduced species which are never seen above high-water mark. The most frequent components are: *Saponaria officinalis* L., *Chenopodium Botrys* L., *C. ambrosioides* L., *Datura Stramonium* L., *D. Tatula* L., *Solanum nigrum* L. var. *villosum* L., *Aristida oligantha* Michx. and *Cyperus esculentus* L.; yet none of these species are found as weeds about the towns along the upper river. Most of these are found along the Santiam also, with the addition of *Aspris capillaris* (Host) Hitchc., *Lychnis alba* Mill., *Scleranthus annuus* L., *Chrysanthemum Parthenium* L. and *Cynoglossum officinale* L. The sand- and gravel-bars along these rivers seem botanically speaking to be a sort of extended ballast-ground, and the collector may feel assured of a surprise on almost every visit. The 28 species of the present list, all of which were growing spontaneously, verify the earlier prediction that a more careful study of our region would raise Piper & Beattie's total of 1617 species to at least 2000. These 28 bring the total now presented in these annual lists to 399. Added to the 1617 of the Flora of the Northwest Coast, the 2000 mark has been exceeded by 16 species. Nor is there any reason to suppose that another season will not result in still further additions. Species plainly introduced are marked * in the following list:

1. *Equisetum laevigatum* A. Br. In cultivated ground under fruit-trees in the Willamette River bottoms near Keizer schoolhouse, four miles north of Salem. Determined by W. R. Maxon.

2. *Potamogeton pusillus* L. var. *tenuissimus* Mort. & Koch. In shallow water on the Polk County shore of the Willamette, opposite Sidney, Marion County. Has probably been taken for the species. Determined by C. A. Weatherby.

3. **Panicum capillare* L. On lawns and street-parking about Salem. The indigenous species formerly referred here is *P. barbipulvinatum* Nash; but our plant is plainly introduced, and well matches authentic specimens of *P. capillare.*

4. **Agrostis verticillata* Vill. In wet sand on the shore of the Columbia River on Hayden Island, Multnomah Co., opposite Vancouver, Wash. Piper and Beattie regard this as identical with *A. stolonifera* L.; but Hitchcock (U. S. Dept. Agr. Bull. 772: 127. 1920) has shown that two distinct species were confused by Linnaeus. The "creeping bent" of lawns about Salem should be regarded according to Hitchcock as a form of the true *A. stolonifera* rather than of *A. alba* L. (now *A. palustris* Huds.). This form is common along the shores of the Willamette, where it appears to be indigenous. Determined by Agnes Chase.

5. *Eragrostis lutescens* Scribn. With the last. A species indigenous to the Snake River basin of Washington and Idaho, but occasionally found along the Columbia. Determined by Agnes Chase.

6. **Eragrostis mexicana* (Lag.) Link. A single plant in a flower-bed on Market Street, Salem. Plainly introduced, as the native range is from southern Cal. southward into Mexico. Determined by Agnes Chase.

7. *Carex teneraeformis* Mackenzie. In dry rocky soil under trees on the southwest slope of Mt. Hood, at 5000 ft. alt. Reported by M. E. Peck from the mountains of southern Oregon. Determined by K. K. Mackenzie.

8. **Chenopodium carinatum* R. Br. Prostrate on the sand on Hayden Island. An Australian species that has been long known in Cal., and collected by the writer at two stations in Curry Co., Oregon in June, 1917.

9. **Chenopodium leptophyllum* (Moq.) Nutt. On parking in front of the Willamette University campus at Salem. Indigenous in southern Oregon. Determined by Bayard Long.

10. **Atriplex Gmelini* C. A. Mey. On the sandy shore of Hayden Island, associated with various other Chenopodiaceae. Determined by P. C. Standley.

11. **Phytolacca decandra* L. A single specimen associated with no. 9. Has been collected in southern Oregon by M. W. Gorman.

12. **Scleranthus annuus* L. On the gravelly shore of the North Santiam River at N. Santiam Station, Marion Co. Determined by M. E. Peck, who has collected it in Josephine and Curry Cos.

13. **Ranunculus acris* L. Well established in a meadow along a small stream one mile north of Brooks, Marion Co. Has also been reported from meadows along the Willamette River in Polk Co., where an apparent hybrid with the native *R. Bongardi* Greene has been collected by Peck.

14. **Ranunculus repens* L. var. *pleniflorus* Fernald. Occasional on roadsides and in waste ground about Salem. Determined by Bayard Long.

15. **Potentilla norvegica* L. On the shore of Hayden Island, in wet sand. The specimens, though numerous, are usually depauperate and rarely found in flower. Determined by C. A. Weatherby.

16. **Coronilla varia* L. Along a stone wall in the grounds of Sacred Heart Academy, Salem. Has been found as a ballast-plant at Linnton.

17. *Euphorbia maculata* L. On a gravel-bar in the Willamette River three miles north of Sidney. Not infrequent in southern Oregon. Determined by M. E. Peck.

18. **Viola arvensis* Murr. With no. 9, evidently imported in grass-seed.

19. **Viola tricolor* L. Common in cultivation, and frequently escaping to garden-borders and street-parking, where it completely reverts to the original wild form with small flowers.

20. **Hedera Helix* L. Very common in cultivation, and carried by the agency of birds to hedgerows and stream-banks about Salem.

21. *Allocarya ramosa* Piper. On muddy shores of the Willamette and Santiam Rivers. A very well-marked and distinct species. Determined by C. V. Piper.

22. **Verbascum phlomoides* L. In gravel on railroad-embankment at Chemawa, Marion Co. Determined by Bayard Long.

23. **Antirrhinum Orontium* L. A single specimen on the same gravel-bar with no. 17. Determined by Bayard Long.

24. *Mimulus peduncularis* Dougl. On the sandy shore of Hayden Island. A species of eastern Oregon and Washington. Determined by C. A. Weatherby.

25. **Lobelia Erinus* L. Commonly cultivated in hanging-baskets and window-boxes, and escaping to cultivated ground at Salem.

26. **Iva xanthifolia* Nutt. In a yard on N. Cottage St., Salem. The family recently moved here from Iowa, where the species is an abundant indigenous weed.

27. **Leontodon nudicaulis* (L.) Banks. A single specimen, with no. 23. Has been collected by Peck on sand-dunes along the coast at Netarts, Tillamook Co. Determined by Bayard Long.

28. *Scorzonella procera* (Gray) Greene. In dry open soil in the State Fair Ground, Salem. Piper & Beattie (Fl. N. W. Coast 354) say that "this has been reported from our limits but the specimens seen are immature and doubtful." My specimens were fully mature, and the difference from *S. laciniata* (Hook.) Nutt. was evident at a glance. This genus appears too feebly separable from *Microseris*.

A few more corrections and extensions of range seem required to bring former lists up to date:

1. *Equisetum hyemale* L. var. *robustum* (A. Br.) A. A. Eaton (no. 1 of the list in Torreya 18: 222. 1918) should according to W. R. Maxon bear the name *E. praealtum* Raf. The specimens from Brooks were probably *E. hyemale* var. *californicum* Milde; but Mr. Maxon determines as *praealtum* specimens collected the past season in gravel-ballast on the railroad-track one mile south of Gerlinger, Polk Co., apparently introduced. This seems the first authentic report of its occurrence in our district.

2. *Salix babylonica* L. (no. 13 of list in Torreya 18: 223. 1918), which has rested on a single specimen from Polk Co., is well established along a stream at Turner, Marion Co., and there is a single fine specimen marking the site of a former homestead near Waconda in the same county.

3. A *Lupinus* resembling *L. columbianus* Heller that is frequent along the sandy flood-plain of the Santiam for several miles above its confluence with the Willamette is tentatively referred by C. P. Smith to *L. variicolor* Steud., but needs further study.

4. *Cryptantha flaccida* (Dougl.) Greene (no. 45 of list in Torreya 18: 225. 1918) reported from Salem, has also been found in gravel along the railroad-track at Tonquin, Washington Co., appearing as if introduced at both stations.

5. *Cynoglossum officinale* L., reported from Mill City (no. 103 of list in Torreya 18: 29. 1918) is now abundant in low woods and pastures along the Santiam for a distance of 20 miles below Mill City, and threatens to become as troublesome a pest as it is in the Eastern States.

6. *Nicotiana attenuata* Torr., previously reported in these lists only from the shores of the Columbia, was found in gravel in the State Fair Ground at Salem.

7. *Mimulus pilosus* (Benth.) Wats., a species of the interior, reported from west of the Cascades only from Vancouver Island (Fl. N. W. Coast 324) was collected on the sandy shore of the Columbia at Columbia Beach, Multnomah Co.

8. *Bidens frondosa* L. (no. 137 of the list in Torreya 18: 31. 1918) seems to be *B. vulgata* Greene as far as the plant so common along the Willamette at Salem is concerned; but true *B. frondosa* occurs on the shore of the Columbia on Hayden Island, according to the determination by Dr. E. E. Sherff.

9. *Artemisia ludoviciana* Nutt. (no. 85 of the list in Torreya 20: 44. 1920) seems as far as the North Santiam plant is concerned to be *A. Tilesii* Ledeb.; but the Portland plant is true *ludoviciana*.

My sincere thanks are again due to all the botanists named above who have so kindly assisted me in the determination of difficult and unfamiliar specimens. Specimens of most of the above have been deposited either in the Gray Herbarium or that of the Philadelphia Academy of Natural Sciences.

Salem, Oregon.

SHORTER NOTES

AN UNRECORDED WEED IN BERMUDA

While Professor H. H. Whetzel was studying the plants of Bermuda with especial reference to fungi in 1922, he collected some flowering plants and handed the specimens to Professor L. H. Bailey, who gave me some of them. Among these was a crucifer collected in an onion field in Paget, March 6, 1922, (No.

1334), which was unknown to me, although I had a specimen of the same species collected by Miss M. Stevens, also in Paget, in the spring of 1913 (No. 69), not taken up, however, in my "Flora of Bermuda" published in 1918.

Professor Whetzel's specimen renewed my interest in the plant and I called on Mr. N. E. Brown of Kew for aid in its identification; he tells me it is *Sisymbrium erysimoides* Desf., a species of southern Europe. Holding, as I do, that *Sisymbrium Nasturtium-aquaticum* L., Water Cress, is the type of the genus *Sisymbrium*, I transfer the species under consideration to the genus *Norta* as **Norta erysimoides** (Desf.) Britton.

The plant is annual, glabrous, erect, little-branched, 3–5 dm. high. The leaves are thin, glabrous, lyrate-pinnatifid, slender-petioled, 3–10 cm. long, the teeth and lobes acute; the small white flowers are in long slender racemes, the short pedicels pubescent on the upper side; the siliques are very slender, spreading, glabrous, 3–3.5 cm. long, the seeds oblong.

N. L. Britton.

White-flowered Primula angustifolia.—About 20 years ago a white-flowered variety (var. of form *Helenæ* Pollard and Cockerell) of *Primula angustifolia* was described from New Mexico. Last year this form was rediscovered by Mr. D. M. Andrews on Arapahoe Peak, Boulder County, Colorado. Thanks to Mr. Andrews, we now have it growing in the garden at Boulder, where it flowers at the beginning of May. Even at an altitude of about 5,500 ft., the flowers of timber-line can be grown successfully on the north side of the house, where they are shaded from the direct rays of the sun. If this were better known, many people might have "timber-line gardens," with the small brilliantly flowered plants of high altitudes, more attractive because blossoming early in the season.—T. D. A. Cockerell.

BOOK REVIEWS

AN ILLUSTRATED FLORA OF THE PACIFIC STATES*

The appearance of the first volume of Professor Abrams' Illustrated Flora is an important event in North American botany, and marks an era in the botanical history of the Pacific States. Hitherto the Pacific coast has been noteworthy as a part of the United States that has never possessed any descriptive work dealing with its flora as a whole; now, suddenly, it takes its place as the only section of our country, except the northeastern states, with a general flora containing descriptions and illustrations of every species of its flowering plants and ferns. To be sure, the volume before us is only one of the three needed to complete the work, but there seems no reason why the remaining volumes should not follow with reasonable promptness.

This book is frankly patterned after Britton & Brown's Illustrated Flora, and follows its style very closely indeed. The pages are of approximately the same size, the type and illustrations of similar style, and the new flora even follows its prototype in the system of nomenclature adopted and in the attempt to assign to each species an English name as well as the technical Latin one. Perhaps the most conspicuous differences are (1) the decapitalization of all specific names; (2) the use of the metric system for all plant measurements.

The present volume includes all of the pteridophytes, gymnosperms, and monocotyledons, and eleven families of the dicotyledons, its scope being almost the same as that of the first volume of Britton & Brown's work; it comprises 568 pages, and contains 1299 figures, of which more than one thousand appear here for the first time. Typographical errors are few for a work of this character. The most serious one observed is on the title-page, where the author's name is printed as if it were "Leroy," although he writes it "Le Roy" and commonly abbreviates it to "L. R."

The area covered by Abrams' flora is only about one fifth of that included by Britton and Brown, but the topography is much more diversified, so that it is hardly surprising that, in

*Abrams, Le Roy. An illustrated flora of the Pacific States: Washington, Oregon, and California. In three volumes. Vol. 1, Ophioglossaceae to Aristolochiaceae, xi + 557 pages, with 1299 figures in the text. Stanford University, California, Stanford University Press, [15 My] 1923.

the groups covered in the volume before us, the number of species in the former is more than three fourths as great as in the latter. So closely does the flora of Abrams follow that of Britton and Brown in arrangement, and in the concepts of families, genera, and species, that it is a very simple matter to compare the two works group by group, and ascertain the relationships of the two floras. In our comparison we have used the second edition of Britton and Brown.

Thus we find that in the coast flora there are about four fifths as many ferns and fern-allies as in the northeastern flora. Only a few genera are notably larger, such as *Cheilanthes*, *Pellaea*, *Notholaena*, and *Selaginella*, while others, such as *Dryopteris*, *Asplenium* and *Lycopodium*, are much smaller. On the other hand, the western species of gymnosperms are almost twice as numerous as the northeastern ones.

There are nearly as many kinds of western grasses as of northeastern ones, but the percentages differ greatly in different tribes. For instance, in *Paniceae* there are 27 Pacific species and 120 northeastern ones, while in *Hordeae* there are 48 Pacific species and only 39 northeastern ones. In other groups, grass genera more largely represented in the coast flora are *Stipa*, *Agrostis*, *Calamagrostis*, *Bouteloua*, *Melica*, *Poa*, *Festuca*, and *Bromus*. The coast Cyperaceae are less than two thirds as numerous as the northeastern ones, the great genus *Carex* being very slightly larger in proportion than the other genera, namely, 167 to 242. One whole series of monocotyledonous families represented in the northeastern flora (Mayacaceae, Xyridaceae, Eriocaulaceae, Bromeliaceae, and Commelinaceae) is wholly without representation in the western area, but these are all characteristically tropical groups, represented to the northward by only a few outlying species.

Among the higher monocotyledons there are some striking contrasts between the two floras. In the Melanthaceae, for instance, the western shows 6 genera and 17 species, the eastern 14 genera and 20 species, yet only one species (*Veratrum viride*) is common to the two; Amaryllidaceae comprises one genus with 4 species in the western, and 7 genera, each with a single species, in the eastern. On the other hand, there are 9 genera and 21 species of Convallariaceae in the western, and 11 genera and 28 species in the eastern, no less than 5 of the genera showing the

same number of species in the two floras. The Liliaceae are, as is well known, very strongly represented in the coast flora; there are 24 genera and 175 species, as compared with only 15 genera and 40 species in the entire flora of the northeast. The Orchidaceae, on the other hand, are much better represented in the northeastern flora; there are only 13 western genera and 36 species, while there are 28 eastern genera and 66 species.

In the few dicotyledonous families treated in this volume, perhaps the most noteworthy features are the complete absence of the genera *Hicoria* and *Ulmus* and the family Moraceae, and the considerable development of the Loranthaceae.

The similarity of treatment between the two illustrated floras has already been commented upon. The most noteworthy variations shown by the Abrams flora are: the transfer of the two grass genera *Sphenopholis* and *Koeleria* from *Festuceae* to *Aveneae;* the union of Trilliaceae with Convallariaceae; and the change in the order of arrangement of some of the families of lower dicotyledons.

For the most part the author seems to have succeeded very well in following the principles of nomenclature adopted by him. Only two exceptions have come to the notice of the reviewer. One of these was intentional, but no adequate justification of it is offered; this is the name of the famous Big Tree, which is called "*Sequoia gigantea* (Lindl.) Decn.," although this binomial dates from 1855, while the same name was given to the coast Redwood by Endlicher in 1847, six years before the Big Tree was discovered. The other exception was surely accidental, and seems to have resulted from a typographical error in Britton and Brown's flora; this is the use of the name "*Aplectrum spicatum* (Walt.) B.S.P.," although the synonym *Arethusa spicata* Walt. certainly belongs to *Hexalectris*.

More than three fifths of the text of this volume has been contributed by specialists in various groups: Pteridophyta (except Isoetaceae), Maxon; Isoetaceae, Pfeiffer; Poaceae, Hitchcock; Cyperaceae (except *Carex*), Britton; *Carex*, Mackenzie; Juncaceae, Coville; and *Salix*, Ball. In these days of specialization, such co-operation is essential; it is to be hoped, however, that in the two remaining volumes the author will find more room for self-expression.—JOHN HENDLEY BARNHART.

WHAT COMES FROM WHAT*

This pamphlet in a series of 41 diagrams modestly attempts to show the relationships and development of all forms of life. The author claims simply "to set forth the opinions of specialists as they have been gathered a little here and a little there." Diagram 1, beginning with *Hydrogenomonas*, shows by arrows the derivation of the nitrobacteria and from them of the flagellates which in turn give rise to the various groups of algae and protozoans. Diagram 2 completes the algae and leads to the mosses in one direction and to the sponges and coelenterates in another. There follow ten diagrams tracing the plant groups up to the *Asterales*, where fifty of the genera are worked out. The remaining diagrams trace the development of animals up to man.

The tables are rather difficult to use as there is but little to show how they are connected to each other. With their maze of lines and scientific names the diagrams can be of little value to any except scientists. The author realizing this has given below each a simple description, the character of which can best be shown by a few quotations: "When the naked seeds of the Gymnosperms clothed themselves with skins or otherwise they became Angiosperms." "It is believed that the fins of fishes, paddling on muddy shores, became feet."—G.T.H.

PROCEEDINGS OF THE CLUB

Meeting of March 13, 1923

The meeting was held at the American Museum of Natural History. The program consisted of an illustrated lecture by Dr. Ralph C. Benedict on "Variation in *Nephrolepis*—its possible Significance." An abstract furnished by the speaker follows:

Variation in *Nephrolepis*, considered as a process, may at present be judged only by its products, the different species and varieties. According to the multiplicity of these, modi-

* What Comes from What or the Relationships of Animals and Plants. Charles L. Abbott, Published by the Author, 600 Ivy St., St. Paul, Minn. 48 pages, 41 diagrams. $1.00.

fications in the germ plasm must take place very frequently. The problem of describing all these multifarious types is most extensive and calls at first for descriptive treatment before any thoroughgoing attempt is made to work out their possible mode of origin through experiment or cell study. While the general run of papers on variation in most plants have to deal with one or two new and undescribed types, the investigator of *Nephrolepis* meets the problem of differentiating and describing scores, even hundreds of new sports. Some of these new types receive the recognition of a florist's name and are likely to be preserved but many do not have the qualities required for horticulture and their only chance of preservation lies in a scientific experimental collection. So many have been accumulated at the Brooklyn Botanic Garden that in the space available it is scarcely possible to do more than grow single plants of many of the most important and interesting varieties. As a matter of convenience, all *Nephrolepis* forms may be classified into four groups.

1. *Systematic species.* All the wild forms are once pinnate, tropical ferns, found in varying habitats and differing in details of habit, color, size, form, scaliness, shape of pinnae, shape of indusium, and other minutiae. The American species appear to number eight or nine, well distinguished on the bases of habitat and form characteristics. When Old World forms are also considered the classification is more complicated as several of the American forms occur also in Africa and Asia. Study of these wild types recognized as species is of special interest as a basis for comparison with the new forms continuallv appearing under conditions of cultivation.

2. *Bud variation in the Boston fern.* From a single variety discovered in cultivation twenty-five or thirty years ago, the Boston fern (*Nephrolepis exaltata bostoniensis*), there have arisen at least one hundred horticulturally named varieties by bud sporting. As many more have appeared which have not received any name. The majority of named types occurred as the result of progressive variation away from the Boston fern along four lines of sporting; viz., increased leaf division, dwarfing, ruffling, and cresting. Six primary sports embodying these four types of variation in different manifestation were followed by a group of secondary sports in which the same four lines of

mutation appeared in intensified form or in combination, and, later, third, fourth and even fifth degree sports carried the intensification of the basic variations to an apparent maximum condition. Variation in the reverse direction also occurs in which the progressive steps are reversed, though without the production usually of sports identical with any of those progressively developed. None of these sports produced fertile spores; reproduction and probably variation occurs in runners.

3. *Spore variation in a fertile type of N. exaltata.* (*N. exaltata fertilis*). One fertile variety has been found in the Boston fern series, although its exact origin is uncertain. Its spore progeny comprise mainly once pinnate forms like wild *exaltata*, and twice pinnate plants of the type of *fertilis*, but perhaps ten per cent present new forms differing in size, leaf cutting, growth habits, susceptibility to disease, etc. Most of this ten per cent of new types is sterile. From several of the fertile strains second generation cultures have been raised in which heredity of parent characteristics is predominant but which offer still further types of variants.

4. *Variation in species other than N. exaltata.* At least ten native species of *Nephrolepis* are in cultivation, especially in England. Several of these species have given rise to new forms under cultivation which parallel those already commented upon under the topic of bud variation of the Boston fern. Some of the same kinds of differences have arisen, though by spore reproduction. Of further interest is the fact that the same types of variation occur in other fern genera, both in cultivation and among wild plants, and the fact that many of the distinctions counted as valid for the separation of species among ferns may be found as bud variants in the Boston fern series.

Adjournment followed.

Marshall A. Howe,
Secretary.

Meeting of March 28, 1923

The meeting of March 28 was held in the Museum of the New York Botanical Garden, beginning at 3:30 P.M. Twenty persons were present. President Richards occupied the chair.

The minutes of the meetings of February 28 and March 13 were read and approved.

The following were elected to membership:

Charles Carroll Greene, 181 Beebe Ave., Long Island City, N. Y.
Leland S. Smith, Alturas, Modoc Co., California.
Miss Rose Wald, 245 Lowery St., Long Island City, N. Y.

After the reading and discussion of a letter from Dr. Francis W. Pennell, it was voted to leave the matter of securing a Bibliographer to a special committee consisting of the President and Secretary.

The first paper of the scientific program was on "Onion Smut" by Mr. A. W. Blizzard. The speaker's abstract follows:

Spores of *Urocystis Cepulae* germinate immediately after maturity in onion decoction or onion agar. The first indication of germination is the putting forth of a spherical promycelium which varies in size. The promycelium soon buds off a varying number of mycelial threads, usually up to eight in number. These mycelial threads branch, and, by continued growth, a tuft of mycelium is soon produced about the germinating spore-ball. No sporidia are produced.

Mycelium of *U. Cepulae* was grown in pure culture on onion agar, and transferred to the following media: sterile bean, carrot, onion, and onion agar. A luxuriant growth was obtained in each case. Forty-eight hours after transfer, it appears as a fluffy, snow-white, little mycelial ball. In five to seven days, the mycelium has spread itself to the extent of a centimeter or more in diameter. At this time a characteristic wrinkling appears, which serves to distinguish the organism. The color is at first white, then gray. The culture may be transferred a number of times without losing vitality.

The cells of the mycelium of old cultures tend to round up and are easily broken apart. If these separate mycelial cells are placed on new onion agar or in onion decoction, each cell will germinate by sending out a branching mycelium, which, in turn, will produce a mass of mycelium. Thus each cell of the saprophytic mycelium may function as a spore. In this way the fungus maintains itself in the soil, by which process the soil is continually being re-infected, the mycelium growing saprophytically. Infection tests were made as follows: onion seeds were sterilized and placed in a sterile moist chamber. Ger-

minating seeds were then transferred to sterile soil in test tubes and pots. Mycelia from the cultures were introduced. Infection occurred in the greatest number of cases. In some pots every seedling was infected and produced spore pustules. Controls uninfected.

The mycelial cells from the beginning of germination are uni-nucleated (the saprophytic mycelial cells). The mycelial cells when broken apart are uni-nucleate and germinate as above described, producing a uni-nucleated mycelium. No fusion of any of the hyphal cells of the saprophytic mycelium occurs.

The parasitic mycelium in the host plant is intercellular, growing and spreading rapidly. Certain of the vegetative hyphae are uni-nucleate but as one follows the hyphae toward the sorus, bi-nucleate cells are found to predominate. Large-sized hyphae were observed to penetrate through several cells of the host. These are supposed to be special nutritive hyphae. Haustoria are rare. Those observed had penetrated the cell walls of the host plant and were clavate in form.

By continued branching and growth of the intercellular mycelia, the cells of the host plant are pushed apart or broken down. This is the beginning of the formation of the sorus. At this stage of development the mycelium of the fungus stains densely. All the mycelial cells of the young sorus are bi-nucleate. The first appearance of spore formation occurs among these hyphae rich in protoplasm. The spore begins by very rapid enlargement of one of the bi-nucleate cells. This growth is so rapid that the enlarging cell encroaches upon the neighboring hyphal cells from which it apparently now draws a portion of its sustenance. The surrounding cells are brought completely under the dominance of the young developing spore. As the spore cell enlarges, the functioning nurse cells adhere or fuse to its wall and become the sterile cells (pseudospores) about the fertile spore, the whole forming the spore-ball. At the beginning, the young spore contains two nuclei, which soon fuse. Thus the mature spore becomes uni-nucleated. By the rapid enlargement of the spore-balls, the sorus bursts the surrounding host tissue, which frees the spores.

The second paper was by Mr. S. A. Wingard on "A Yeast Disease of the Lima Bean." The following abstract was furnished by the speaker:

Examination in the fall of 1921 of diseased Lima beans from eastern and central Virginia revealed the presence of the vegetative cells, asci and ascospores of a yeast which later proved to be the organism responsible for the disease. The yeast proved to be a species of the genus Nematospora which was established by Peglion in 1901, but it differed in certain characters from the species previously described; therefore, the name *Nematospora Phaseoli* was proposed.

The disease occurs on the seed in the pod, causing numerous dark, sunken areas on the cotyledons. Infection occurs at any time during development, but the most severe damage results when infection takes place before the seed is half grown. Affected seeds vary from one tenth to the normal size. The disease has been found in ten counties in Virginia. The loss from the disease in severe cases amounts to as much as 60 per cent of the crop.

The organism grows well on beerwort agar and also on vegetable material such as beet, carrot, parsnip, turnip, seed potato and Irish potato. The optimum temperature is about 30 degrees C.

The vegetative stage of the organism is composed of the typical yeast cells but in some cases a mycelium is produced. Asci and ascospores are produced in great numbers in the lesions on the Lima bean seed and also on favorable culture media. The asci are cylindrical with rounded ends, 60–80 $\times$ 10 microns; ascospores 8, in two groups of 4, 40–46 $\times$ 2.5–3 microns, slender, 1-septate, apex acute, base extended into a slender, non-motile whip, which averages about one and one fourth times the spore length.

After discussion, adjournment followed.

Marshall A. Howe,
Secretary.

Meeting of April 10, 1923

The meeting of the above date was held at the American Museum of Natural History, beginning at 8:15 P.M. President Richards occupied the chair. Fourteen persons were present.

The program consisted of an illustrated lecture on "Shade Trees" by Dr. W. A. Murrill. The speaker discussed several

phases of this rather comprehensive subject, including the value of shade trees and their selection, arrangement, planting, protection, and care. The slides used in illustrating his remarks were largely made from photographs taken by him on his travels. Although lawn and park trees were mentioned more than once, attention was given chiefly to trees adapted to city streets, such as the red oak, the plane-tree, and the Norway maple. A bulletin on this subject, prepared by Dr. Murrill, was published and distributed several years ago by Cornell University.

Adjournment followed.

MARSHALL A. HOWE,
Secretary.

NEWS NOTES

The first forestry camp for Boy Scouts has been organized this summer in connection with the large group of scout camps on the Kahnowahke Lakes in Harriman Park. Here some forty boys have lived in the dense woods on the side of Wildcat Mountain, receiving instruction on trees and forestry. Below the tents is Spruce Pond with a narrow border of sphagnum bog with its pitcher plants, sun-dews and heaths, and at one side a tangle of rhododendron. Mr. George E. French of the Syracuse College of Forestry is director of the camp with Professor S. N. Spring of Cornell in charge of instruction and Mr. B. T. B. Hyde as supervising Director.

TORREYA

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ADDITIONAL NOTES ON SONCHUS ULIGINOSUS

Harold W. Pretz

The distribution of *Sonchus uliginosus* in the Philadelphia region has been well recorded by Mr. Bayard Long in a recent contribution* but during the past season additional collections and observations relating especially to its economic status and identity have been made that seem worthy of note. Since it was first collected in 1917 it has not only been found in many new localities but it has been observed appearing in areas familiar through field work. This season of 1922 collections have been made from eight new areas (not before reported) and there still remain to be visited other *Sonchus* stations observed while enroute on passing trolley cars. Though in some stations it has been observed to persist for years and apparently spread during this time, often in spite of cultivation, it is yet too early to very definitely note its spread in the region, or even in specified local areas.

It has already been noted† that the *Sonchus* spreads by long horizontal roots and some opportunity was had to note something of its behavior in this respect. On July 23 the underground parts of the *Sonchus* were examined in a fallow field where corn had been growing the season before. It was difficult to follow roots in the stiff soil with a botanical trowel but one root was followed for slightly over thirty inches from a rosette, after which a much thinner root was followed about five inches, when it was lost in digging. This root was about two to four inches from the surface and was unbranched. In

* *Sonchus uliginosus* occurring in the Philadelphia Area, Bayard Long, Torreya, Vol. 22, No. 6, p. 91.

† New records and other notes on North Dakota plants, O. A. Stevens, Torrey Bulletin, Vol. 49, No. 4, p. 102.

digging, roots were found to cross each other and one was noted from which, close to the surface, two plants arose slightly more than an inch apart.

On October 8 a very large grass field, unmowed this season, was visited. In this field the *Sonchus* was extremely abundant throughout. A part of this field had been burned over and in this area, where the ground had been cleared of old growth, it was now quite green in places with the abundant fresh vegetative growth of the *Sonchus*. This growth was variously disposed in isolated rosettes or groups obviously related to the same individual root system. Some of these fresh plants were collected and have yielded some interesting information. For instance, five plants were found to show above the surface from an association of roots that when pressed measured three inches in diameter and two of these arose within the space of ¼ inch. (In the adjoining cornfield earlier in the season three robust, mature plants arising from a vertical shoot were as close to each other as this.) Horizontal roots were abundantly present and varied in thickness but those observed averaged little thicker than ⅛ inch in diameter and often less. One root of over a foot in length between rosettes was found to be almost threadlike at the points of attachment and normally thickened toward the centre. The roots seem to be plentifully supplied with buds and at times appear quite "knobby" with them. These protuberances that become growing buds were less evident on the roots noted in July so that it is quite possible that they may develop best toward the end of the season. On one horizontal root five buds were found starting from one side of a root with two on the other within the space of 1¼ inches. A space of 2 inches would have included several more. With such conditions it is not surprising that six separate plants were found that had reached the surface within the space of 1¼ inches or eight within about 4¼ inches.

Through the courtesy of Mr. A. S. Weibel, on October 29, several holes were dug about a grass and alfalfa field on his farm, in the Saucon valley, where the *Sonchus* has persisted for several years. The soil here is very stiff and clayey and it was extremely difficult to follow roots through it without severing them and losing sure connection. The usual network of roots was found with rosettes variously disposed, but one horizontal

root was followed for about 27 inches from a rosette to a severed end, and another bore two rosettes on vertical shoots 18 inches apart. What determines this variability in the position of rosettes on roots was not apparent but it was observed that a horizontal root may reach close to the surface, bear a rosette without any apparent vertical shoot, and continue on. Possibly depth may have something to do with it, for the often abundant roots at varying depth usually seemed to be plentifully supplied with buds. On one root 27 buds were counted within a space of 6 inches and this did not include all protuberances that may be assumed to be buds. One root had 14 actively pushing buds within a space of 6 inches. One vertical shoot with rosette had five such growing buds within the space of an inch.

No roots were found to penetrate deeper than 7 inches and most were not so deep. Thus the depth to which roots may extend—and presumably escape the plough—has not been carefully observed but the plant appears to be well able to spread rapidly whether disturbed or not by cultivation. Each piece of root cut in cultivation is presumably well fitted to "carry on," if not buried too deep or exposed too much. A good example of the rapidity with which the plant may spread and occupy an area was noted at the Weibel farm where a strip of the field was planted with raspberry bushes and recently cultivated. The rosettes of the *Sonchus* here practically covered most of the surface at places. (Elsewhere in recently-seeded fields it has been observed to be sending up fresh rosettes with growing crops.) It would be interesting to know whether single colonies of this plant in undisturbed situations really represent more than one individual plant. This was strongly suggested by one such colony, more or less circular in outline, observed in a grass field. The often uneven distribution in fields where the plant is abundant also suggests this. At the Weibel farm the *Sonchus* has proven to be very troublesome and it is obvious that a plant with such characteristics as here noted easily may become one of the most persistent of weeds.

A most interesting point that has arisen in the local observation of the plant concerns its proper identity. There are present in the local area two types of perennial *Sonchus* that appear to differ only in the presence or absence of glandular hairs on the inflorescence and its branches. Only one collection of the plant

with glandular hairs had been made up to 1921. At that time it was referred to *S. arvensis*. Recent examination, however, of the series of *S. arvensis* from the Old World and America at the Academy of Natural Sciences of Philadelphia gave the impression that this plant could not be satisfactorily identified with that species. This is evidently a matter for diagnosis by some student of *Sonchus* and the observations here noted are merely intended as suggestions that may be helpful in such a study of the plant.

This season additional glandular material was discovered locally and in one case both types were found growing together. This led to a visit to the locality where it was first collected to discover whether any of the glabrous type might be present with the glandular. A part of this area was freshly ploughed but the plant was found along the roadside—abundantly at places, especially along the sides of the road adjacent to the fields—for a distance of over half a mile, and also in part of the area previously visited (now planted in corn). The area of occupancy in the fields here is apparently not coextensive with that of the roadside. No *Sonchus* with glabrous heads was found. The glandular heads were so distinct that identification at sight was easy. There were few, if any, plants along the roadside embankments, etc., that had not grown to maturity after the roadsides had been mowed and these mostly showed glabrous branches of the inflorescence with bracts on the pedicels bearing one to few glandular hairs or none.

Westward along the highway, about 800 feet from the apparent limit of occurrence of the glandular plant, it was with considerable surprise that a large field was noted that was yellow with the bloom of *Sonchus*. This field, which extends for about 800 feet along the highway, is of even greater depth. In a walk around this field among hundreds, and more probably thousands, of blooming *Sonchus*, none was found that was not of the glabrous type. This grass field was not mowed this season and doubtless this was responsible for the mostly rank vegetative growth as well as for the abundant bloom. In a cornfield adjoining and along its edge adjacent to the grass field, plants occurred that were especially robust and vigorous owing, probably, to the benefits of cultivation. Several of these latter plants in the cornfield were between 6 and 6½ feet high. (Later in the season some were noted to reach even 7 feet or over.)

That these large areas of different types should exist independently so near to each other is interesting. None of the glabrous type was noted along the roadside but an isolated occurrence of the glandular type was found beside the road opposite the cornfield, where the glabrous type grew among the corn—an extension, doubtless, from the glandular type of abundance along the road further east. A small colony, perhaps 10 or 15 feet south of the fence line of the field of glandular plants (the only one noted in this large, weedy, fallow field) suggested that it might have been introduced as easily through long travelling roots as from seed. The apparent absence of the *Sonchus* from fields closely adjacent to such areas of great abundance is always interesting and suggests a field for observation concerning the rapidity of occupancy through root agency and the probable spread through seed.

Though plants of both types vary in height according to conditions, they normally appear to be tall-growing plants. Three plants of a colony of the glandular type, collected in a weedy, semi-open situation in a denuded woodland close to a highway, measure respectively 58, 64 and 67 inches in height, and some plants in a cornfield were observed that were over 6 feet in height. Plants of the glabrous type in a cornfield, as already noted, were observed to be even taller. Some material of the glabrous type collected measured in even inches respectively 27, 29, 29, 30, 31, 34, 34, 36, 37, 38, 40, 41, 42, 44, 45, 46, 48, 52, 55, 61, 61 inches in height. Some of these plants grew to late maturity in mowed areas and are lower than the average. Two plants of such late growth of the glandular type, collected along a mowed roadside, measure respectively 25 and 26 inches in height. In one field (unmowed this season) many plants of the glabrous type were found with vigorous growth above prostrate dried growth of other species, especially Red Clover. It was found that these plants had a stem, bare of leaves, that lay prostrate with the dried growth. Many of these plants were in bloom and three of them, collected, measure respectively 54, 49 and 47 inches in height, including the bare prostrate stem of respectively 22, 19 and 16 inches.

The expanded heads of both types are very showy and of a bright yellow color, opening early in the day and closing in the afternoon, at least on clear days. It was not found possible to

make any distinction in color between the two types. Several of the larger expanded heads from robust plants of the glabrous type, growing in a cornfield late in the season, were found to measure from 1½ to 1⅝ inches across—or even more in some cases. No glandular type heads of similar robust plants being available, those of fresh late roadside growth were measured and were found to be slightly less than 1½ inches across. Closed involucres of the glabrous type with petals dropped and tapering to a blunt point from a rounded "knobby" base were found to be about 9/16 inch high with a width at the rounded "knobby" base of about 5/16 inch. Enough such heads were fitted to a scale drawn in a notebook to indicate that this was a fairly close average for maximum size mature heads. Unopened buds varied with age and were blunt. Heads from the glandular type approximated the same average measurements. The involucre of both types is rather light green even in pressed material, unless badly cured in pressing.

Heads of the glandular type appear always to have glandular hairs plentifully present over the involucre, and glandular hairs, at times sparingly or abundantly, have been noted to extend along the branches of the inflorescence as far as 6 to 7 inches below the tops of the heads. The absence of glandular hairs on the branches of the inflorescence in many plants of late growth of the glandular type has already been noted. Plants of the glabrous type appear to be quite destitute of glandular hairs but in all material examined sticky dots, usually roundish in outline, are present in varying abundance along the edge of the involucral bracts of the heads (even in bud) as well as elsewhere on the surface. These "gummy" or sticky dots have been noted to cause heads of the glabrous type to stick slightly to the paper in pressing. They have also been noted on material of the glandular type but more rarely and it is possible that they represent excrescences caused through puncture by sucking insects.

Achenes of the glabrous type examined were brown in color, oblong, slightly tapering, compressed and with 12 heavy longitudinal, rugose ribs. Those of the glandular type examined appear to be quite similar.

It is hoped that the above observations may be found helpful in a study of this plant. Material representing all collections

is in the Herbarium of the Academy of Natural Sciences of Philadelphia.

ALLENTOWN, LEHIGH COUNTY, PENNSYLVANIA.

SHORTER NOTES

A WOODLAND PLANT THAT IS BECOMING A GRAINFIELD WEED

ALBERT A. HANSEN

It is rather an uncommon occurrence for woodland species to acquire the habit of invading field crops but this strange situation is presented by *Phacelia purshii* in Indiana.

The species is found in abundance in open woods in many parts of the state and botanists usually record the occurrence of the plant in "moist woods and thickets." During April, 1922, County Agent D. D. Ball of Rush County, Indiana, sent a specimen of *Phacelia purshii* for identification with the statement that, in one part of his county, "there are about 500 acres of clover and wheat infested by this plant, which is a serious pest. The wheat especially will not grow in patches infested by the weed."

A few days later another specimen of the same species was received from W. A. Crutz, manager of the Imperial Mills of Cambridge City, Indiana, with the statement that "this plant was brought into my place of business and is a new one in this locality. It is noted among farmers for its damage to wheat and oats. It grows best on sandy loam and on river bottom land. One farmer is now planning on mowing a field of oats that is so badly infested that the oats are being choked out by the weed."

The next report of the occurrence of this new weed came from County Agent A. J. Hesler of Fountain County, Indiana. He stated that the weed "has lavender flowers that bloom about May 30. It is a very bad weed, especially on the Hayes farm in this county where it is dominating a field of oats."

The identification was verified by the Office of Economic and Systematic Botany of the United States Department of Agriculture. Since the various reports suggest that the species is a potentially dangerous weed, a picture of the plant together with

a note of warning to farmers was published in "The Indiana Farmer's Guide" of June 2, 1923 and shortly afterwards another specimen was received from the farm of A. J. Bacon of Akron, Fulton County, Indiana. It is evident that *Phacelia purshii* is becoming established as a grainfield weed in central Indiana, an unusual habit for an erstwhile woodland species. Since the plant has no recognized common name, the generic part of the technical name is being used for this purpose since phacelia is a euphonious word that is easy to pronounce.

Plant ecologists may be interested in this common woodland species that is apparently developing into a serious pest in small grains and clover.

Division of Botany,
Purdue University Agricultural
Experiment Station.

Some Botanic Garden Material Useful in High School Work

R. C. Benedict

Mr. Boynton's report on species of *Kleinia* at a recent Torrey Club meeting suggests a comment on the availability of this genus as material for laboratory work in high school biology. For some years the writer has regularly made use of the fleshy stem of *Kleinia* to illustrate typical stem structure of a dicotyledonous plant. The ordinary *Kleinia* leafless stems are over one half inch in thickness. The bundle arrangement is a simple ring seen in cross section with a large pith and a definite cortex. Sectioned freehand with a razor the specimens are large enough to show their structure without the use even of a hand lens.

In the younger parts of the branches the bundles in cross section are distinctly separated but they early show the development of interfascicular cambiums. In older parts of the same stem the bundles have grown considerably both in a radial direction and through the differentiation of the inter-fascicular cambium. Scattered through the cortex are smaller bundles, mainly circular, the leaf traces. Sections of *Kleinia* (such species as *K. articulata* and *K. anteuphorbia*) are approximately the size of the ordinary prepared section of corn stem. If the *Kleinia* stem is placed in red ink a few hours before sectioning, the bundles will show the rise of this liquid very clearly.

VARIATION

In connection with advanced biology work the laboratory study of material illustrative of variation has been found useful. For the fluctuating variation the ordinary "yellow-eyed" bean of the seedsman furnishes material in which intergrading series showing variation in the size of the pigmented spot, of the depth of color of the spot, as well as of the total size of the bean, are easily discovered by the pupil. Material for mutation is easily obtainable in the form of some of the definite sports of the Boston fern series. The distinct differences of these bud variations are represented in separate pinnae and these latter furnish objects for representation by the pupil entirely within his ability to draw in a short time. A single laboratory lesson on variation may include both the fluctuation and the mutation types.

HABITATS

The topic of the adaptation of plants to different habitats always occupies a considerable place in high school biology, especially in the more advanced courses. Pupils of Stuyvesant High School to the number of 150 or more visit the Brooklyn Botanic Garden each term in connection with their term's work in plant study and, in groups of about 30, are shown the characteristics and adaptations of plants arranged under six habitat groups:—

(1) Xerophytes.
(2) Hydrophytes.
(3) Epiphytes.
(4) Insectivorous plants.
(5) Parasites and saprophytes are also included in the discussion though the illustrative material for these latter is not usually available.

Further in connection with this field trip the attention of the pupils is called to characteristic examples, and general economic importance of six main groups of plants, broadly classified as phyla, viz.: bacteria, fungi, algae, mosses, ferns and seed plants. The special display of plants arranged to show the probable evolutionary development of the different types at the Brooklyn Botanic Garden, house No. 2, makes a particularly good station for a description of plant phyla.

In general the purpose of the trips is to show the city boys a considerable range of actual living, growing plants, and a Botanic Garden is a specially favorable place for such a trip.

New York City.

HIGH SCHOOL BIOLOGY AND THE NEW YORK BOTANICAL GARDEN

G. T. Hastings

The New York Botanical Garden is made use of by some of the schools at the Bronx and Manhattan in much the same way that the Brooklyn Garden serves Stuyvesant. Every term the biology classes of Morris and Evander Childs High Schools, and at times other city high schools, visit the garden. The pupils, often 600 or more, are taken through the greenhouses in groups of 25 or 30 led by members of the garden staff or teachers.

Plants of Commerce

In addition to studying the habitat groups in the desert house and the others, various plants such as cacao, coffee, cocoanut, camphor, Manilla hemp, rubber, tea, etc., are marked with large labels and studied by the pupils. Later in the museum the products of the same plants are seen and the methods of preparation studied. The classes conclude their visits with illustrated lectures in the large hall of the museum.

Variation under Cultivation

Pupils of botany classes also visit the garden every term, especially in the spring to see the display of tulips and in the fall the dahlias. The hundreds of varieties of these plants make a splendid illustration of the way plants vary and of what may be done by selection.

Public Lectures

Many pupils visit the garden individually or in small groups, often to get material for class reports. Some of the pupils also attend Saturday lectures. The biology classes of St. Ursula's regularly attend these and reports on the lectures are a required part of the class work.

City biology teachers often feel that they are handicapped by the surroundings under which their pupils live, but the city

museums and botanic gardens offer much to compensate for the lack of things that surround the country pupils.

New York City.

PROCEEDINGS OF THE CLUB

Meeting of April 25, 1923

The meeting of the above date was held in the Museum of the New York Botanical Garden.

The following were elected to membership:

John M. G. Emery, Garden City, N. Y.

Prof. Will S. Monroe, Montclair, N. J.

Rafael A. Toro, Insular Experiment Station, Rio Piedras, Porto Rico.

The first paper on the scientific program was by Mr. J. A. Faris on "The Black Stem Rust of Wheat and the Common Barberry in the United States." An abstract by the speaker follows:

The increasing losses during recent years due to the black stem rust (*Puccinia graminis*) of small grains throughout the north central grain-growing states led the United States Department of Agriculture to make a survey to determine the presence of the common barberry throughout this region. Studies were also made to determine what part the barberry was taking in the spread of stem rust to the wild grasses and neighboring grain fields.

This preliminary survey revealed the wide-spread occurrence of barberry throughout the entire region and bushes were found to be rusted in April and May. The rust spread from the infected bushes directly to the wild quack grasses, wild barley, etc., and to neighboring grainfields several weeks before rust appeared upon grainfields considerable distances from infected barberry.

In order to prevent this early spread of the rust and to eliminate several million centres of infection, a campaign to eradicate species of *Berberis* and *Mahonia* susceptible to the stem rust was begun in 1918. This campaign is now being vigorously carried on by both the United States Department of Agriculture and the individual states in the eradication area. All the states have passed laws requiring the eradication of these barberry bushes.

One of the most alarming phases of the situation is the escape of the common barberry from cultivation through the dissemination of seeds by birds and through other agencies. Such escaped barberry has been found along streams, in wooded areas, fence rows, etc., and presents one of the most difficult problems of the campaign. Chemical means of killing the bushes have been found effective in preventing sprouts from broken roots from reproducing the shrubs.

The campaign involves a vast amount of work since the inspectors must examine all plantings of shrubbery as well as wooded areas to make sure some bush does not go unnoticed and in after years serve as a centre for spread of stem rust and of barberry seeds which in turn will produce more bushes to spread the rust.

The second paper was by Dr. Alfred Gundersen on "The Systematic Position of the Caryophyllaceae and the Frankeniaceae." The author's abstract follows:

The little group of salt-loving plants, the *Frankeniaceae*, appears to be a link connecting the *Caryophyllaceae* and related families with the great group of flowers which have chiefly parietal placentation.

The genus name *Frankenia* was given by Linnaeus. In the *Fragmenta Methodis Naturalis* he places it in *Caryophyllei*. Jussieu places it among "genera *Caryophylleis affinia*." St. Hilaire in 1824 established the family *Frankeniaceae*, placed by De Candolle before the *Caryophyllaceae*, an arrangement kept up by Bentham and Hooker. But in the Eichler and the Engler systems these families are far separated.

The *Frankeniaceae* are mostly small tufted shrubs, a few herbaceous plants. The *Caryophyllaceae* have often a similar appearance, only a few being woody. The leaves of both families are opposite, narrow and entire, in the *Frankeniaceae* often with rolled edge. The slightly swollen node and stipular sheath are very similar in the two families. The inflorescence in both cases is a cyme, with regular flowers. The calyx of the *Frankeniaceae* is gamosepalous, like the *Dianthus* group of the *Caryophyllaceae*. The ridges of the calyx suggest *Plumbago*. The ligule of the petals is a remarkable character common to these families. The pistil is one-celled, of several carpels. In the Frankenias the placentation is parietal, with ovules at the lower end only. In

the *Caryophyllaceae* the placentation is central, but in some cases, such as *Scleranthus*, there is only a single ovule and seed, much like the single seed of part of the Frankenias. The capsule, the often papillate seed, and the presence of endosperm are other common characters. While a majority of the *Caryophyllaceae* have a curved embryo, it is nearly straight in *Dianthus* and other genera.

In conclusion, these numerous striking similarities seem to support the earlier view that, in a natural system, the *Frankeniaceae* and *Caryophyllaceae* cannot be separated.

The *Elatinaceae*, doubtless near *Frankeniaceae*, also in several ways suggest *Caryophyllaceae*.

The few differences between the families *Frankeniaceae* and *Caryophyllales*, the more herbaceous forms, the central placenta, and the usually curved embryo of the latter group suggests that this is the more highly specialized group. In any case the placing of *Caryophyllaceae* before the Ranales appears to be entirely misleading.

After discussion, the meeting adjourned.

Marshall A. Howe,
Secretary.

Meeting of May 8, 1923

The meeting of the above date was held at the American Museum of Natural History.

Tenny V. Dickson, New York City, was elected to membership. The resignation of Miss M. Beatrice Greenwood was accepted.

The program of the evening consisted of an illustrated talk by Dr. Marshall A. Howe under the title of "Some Floral and Scenic Features of Cuba."

The New York Botanical Garden during the twenty-five or more years of its existence has sent numerous exploring expeditions to Cuba and these have added much to the existing knowledge of the flora of the island. Photographs, taken chiefly in the provinces of Pinar del Rio, Oriente, Camagüey, and Matanzas, were exhibited. Conspicuous in the flora of the dry southeastern parts of the island are the cacti, some of which have been described as new by Drs. Britton and Rose. Among the cacti is the remarkable *Dendrocereus nudiflorus* which grows

to be twenty-five or thirty feet high and has a tree-like trunk sometimes two feet in diameter. Another one, a *Pereskia*, resembles a small apple tree and, unlike most cacti, has well-developed leaves. A cactus of very different habit, the melon cactus or Turk's-head, forms simple, egg-shaped cushions one or two feet high, surmounted by the reddish, fez-like outgrowth which bears the flowers. The Turks Islands are said to have derived their name from the abundance there of a plant of this general character.

The palms, of which there are about thirty kinds in Cuba, constitute a conspicuous feature of the flora of the island. The stately royal palm may be considered Cuba's noblest contribution to the landscape gardening of the tropics.

MARSHALL A. HOWE, *Secretary*.

MEETING OF MAY 23, 1923

This was a joint meeting of the Torrey Botanical Club, the New York Bird and Tree Club, the American Fern Society, and the Wild Flower Preservation Society of America, and it was held at the Brooklyn Botanic Garden. Nearly one hundred members of these organizations and their guests met at 11 A. M. and were conducted around the Botanic Garden by Dr. Arthur H. Graves, Dr. George M. Reed, and Mr. Norman Taylor.

At 2:30 P. M. an audience of about seventy-five assembled in one of the lecture rooms and witnessed a demonstration of an automatic balopticon and a daylight projector by Mr. P. L. Ricker, Secretary-Treasurer of the Washington (D. C.) Chapter of the Wild Flower Preservation Society of America. The photographs and legends exhibited were especially designed for wild flower preservation publicity in schools and public places.

This demonstration was followed by an illustrated lecture on "Game Laws for Ferns and Wild Flowers" by Dr. Ralph C. Benedict, Editor of the American Fern Journal. Dr. Benedict discussed existing laws on this subject in Connecticut, Maryland, and Vermont, and exhibited colored lantern-slide photographs of plants in special need of protection.

A motion was made by Augustus O. Bourn, Jr., that the members of the associated societies present express their approval of legislation looking toward conservation of American wild flowers. This was unanimously carried. On motion of

Dr. Benedict it was voted that the meeting appoint a committee to consider what further steps should be made toward conservation with special reference to drafting a law for the state of New York. Mrs. Albert Michelson, of the Illinois chapter of the W. F. P. S., described work that was going on in Illinois along the line of conservation. Dr. Gager felt that the object of the committee should be to enter into communication with all of the organizations of this state to consider what further steps should be made toward conservation of American wild flowers. Mrs. William E. Jones of Philadelphia, from the Pennsylvania branch of the W. F. P. S., stated that she felt that her society would gladly cooperate. Dr. Gager recommended that a suitable committee be elected quickly. Mrs. Britton felt that the State Museum at Albany should be represented in the legislation. Mr. Bourn advocated a small committee of four members. Thus only would the work go through quickly. Mr. P. L. Ricker, of the Washington branch of the W. F. P. S., thought that the societies of other states should appoint similar committees for their states to incorporate similar laws. Mrs. Britton suggested the following persons for the proposed committee: Dr. G. Clyde Fisher, of the American Museum of Natural History, from the New York Bird and Tree Club; Dr. M. A. Howe, of the New York Botanical Garden, from the Torrey Botanical Club; Dr. R. C. Benedict, of the Brooklyn Botanic Garden, from the Fern Society; Dr. Homer D. House, of the State Museum, from the W. F. P. S. Dr. Benedict suggested that there be invited into this committee a representative of each of the two New York Gardens and also a lawyer. Mr. Bourn spoke in favor of this suggestion. A motion to this effect was made and carried. The motion of Dr. Howe that Mr. Bourn be added to this committee as legal representative was carried. Mrs. Britton suggested that a general law, intelligible to everyone and applicable to special plants, was called for. Extemporaneous meetings of each of the societies represented were then held consecutively, and the delegates suggested by Mrs. Britton were thus duly elected. It was suggested that this committee should take the necessary steps to formulate a conservation law, and should send copies of this law to secretaries of all interested societies.

A. H. Graves and Marshall A. Howe,
Secretaries.

NEWS NOTES

Dr. Marshall A. Howe, Secretary of the Torrey Botanical Club, has been elected to membership in the National Academy of Sciences.

Dr. Mel. T. Cook, formerly Professor of Plant Pathology in Rutgers College and Plant Pathologist of the New Jersey Agricultural Experiment Station, is now located at the Insular Experiment Station at Rio Piedras, Porto Rico, as Expert on Diseases of Sugar Cane.

Dr. W. W. Rowlee, Professor of Botany in Cornell University, died on August 8th in his sixty-second year. He had been especially interested during recent years in the balsa or corkwood (*Ochroma Lagopus* and its relatives.) His studies of these light woods, used in the construction of aeroplanes and life-rafts, had taken him to Costa Rica, Nicaragua, Guatemala, and elsewhere in the tropics. He had been for several years a member of the Torrey Botanical Club.

Dr. Charles Frederick Millspaugh, Curator of the Department of Botany in the Field Museum of Chicago since 1894, died on September 15th in his seventieth year. Dr. Millspaugh, who was born in Ithaca, N. Y., and was a nephew of Ezra Cornell, founder of Cornell University, was for several years in early manhood a practising physician at Binghamton, N. Y. Later he was for a short period botanist at West Virginia University. He devoted much time to travel and botanical exploration, and made collections in Mexico, Brazil and numerous islands of the Antillean region.

A largely attended dinner in honor of Dr. H. H. Rusby, Dean of the College of Pharmacy and Past President of the Torrey Botanical Club, was held at the Hotel Pennsylvania on the evening of April 16th. The climax of the program was the presentation to him of the Remington Honor Medal, awarded by the New York Section of the American Pharmaceutical Association for the most noteworthy contribution to pharmacy during the preceding year, with special reference to his achievements as head of the Mulford Expedition to South America.

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RESISTANCE OF TREES TO ICE STORM INJURY

WALTER E. ROGERS

In a previous paper the writer* presented some data on the extent of accumulation of ice on trees during the glaze storm of 1922 in the Great Lakes region. Seeley† in Monthly Weather Review gives general estimates from various observers in Michigan on the amount of damage to trees. The present paper deals in a detailed way with the extent of injury to different species.

During the weeks following the storms examinations were made of over two thousand trees, representing nearly forty species. These grew within a ten mile radius of the northern end of Lake Winnebago, Wisconsin, and included trees of a variety of habitats such as city street, country roadside, river bank, farm woodlot, and swamp.

In the field the trees were listed in three divisions on the basis of size, the mature trees being designated as "large," the saplings as "small," and those of intermediate size as "medium." The trees in each division were classified on the basis of damage received, those having half or more of the crown broken being designated as "heavily damaged;" those having lost less than half the crown, but still badly injured, were indicated as having received "medium damage," while trees with no injuries at all, or with injuries no more severe than a broken branch or minor limb were placed in the column with the "slightly injured." Finally, trees which were permanently bent, but not broken, were noted. The results of the study are embodied in the table on the following page.

In making out the ranking of the species in the order of their resistance to storm injury, the figures of column 15 were added to those of column 14. This assumes that permanent bending is equivalent to at least medium damage.

* Rogers, Walter E.: Ice Storms and Trees. Torreya, 22: 61–63.

† Seeley, D. A.: The Great Glaze Storm of February 21–23, in Michigan. Monthly Weather Review, 50: 80–82.

It will be noted that all fractions have been omitted from the columns.

	Large Trees				Medium Trees				Small Trees							
	Number of trees (1)	% Heavily Damaged (2)	% of Medium Damage (3)	% Slightly Damaged (4)	Number of trees (5)	% Heavily Damaged (6)	% of Medium Damage (7)	% Slightly Damaged (8)	Number of trees (9)	% Heavily Damaged (10)	% of Medium Damage (11)	% Slightly Damaged (12)	Total Number of Trees (13)	% Seriously Damaged (Heavy & Medium) (14)	% Permanently Bent (15)	Rank in Resistance (16)
Acer Negundo	6	66	33	0	9	11	44	44	40	25	10	65	55	45	0	17
Acer sp.*	13	46	23	30	77	28	37	18	9	11	33	33	99	64	13	26
Acer platanoides**	—	—	—	—	—	—	—	—	4	0	0	100	4	0	0	—
Acer saccharum	1	0	100	0	49	12	36	51	25	12	20	68	75	44	0	16
Alnus incana	—	—	—	—	18	33	50	0	—	—	—	—	18	83	16	28
Amelanchier canadensis	—	—	—	—	5	0	0	100	—	—	—	—	5	0	0	—
Betula alba	—	—	—	—	39	48	10	35	7	42	0	57	46	54	0	18
Betula lutea	—	—	—	—	26	23	19	57	37	8	0	91	63	22	0	12
Carpinus caroliniana	—	—	—	—	19	0	10	89	12	8	0	83	31	9	3	6
Carya ovata	6	0	0	100	63	11	15	73	22	0	0	100	91	19	0	10
Catalpa speciosa	—	—	—	-	14	0	7	92	22	0	0	100	36	2	0	1
Celtis occidentalis	1	0	0	100	18	27	22	11	6	0	16	33	25	40	40	27
Crataegus sp.	9	11	11	77	14	0	14	85	1	0	0	100	24	16	0	8
Fagus grandifolia	—	—	—	—	27	3	70	25	16	37	12	50	43	65	0	21
Fraxinus americana	4	50	25	25	54	11	18	70	28	10	0	89	86	25	0	13
Fraxinus nigra	7	42	42	14	127	21	17	43	20	20	15	45	154	40	17	19
Gleditsia triacanthos	5	0	0	100	2	0	0	0	—	—	—	—	7	0	0	—
Juglans cinerea	1	0	0	100	30	6	26	66	5	0	0	100	36	27	0	14
Ostrya virginiana	—	—	—	—	45	13	11	75	34	2	2	94	79	16	0	7
Picea abies	—	—	—	—	56	3	0	96	2	0	0	100	58	3	0	2
Populus alba	1	0	100	0	5	0	0	100	—	—	—	—	6	16	0	—
Populus balsamifera	—	—	—	—	9	0	22	77	—	—	—	—	9	22	0	—
Populus deltoides	8	16	33	0	90	64	25	6	1	0	0	0	99	89	4	31
Populus grandidentata	6	0	100	0	90	11	53	33	20	0	0	50	116	55	10	20
Populus nigra italica	—	—	—	—	3	100	0	0	—	—	—	—	3	100	0	—
Populus tremuloides	12	66	16	0	27	51	22	14	89	20	1	12	128	36	50	29
Prunus pennsylvanica	—	—	—	—	9	77	0	22	1	0	0	100	10	70	0	22
Prunus serotina	—	—	—	—	8	0	37	62	—	—	—	—	8	37	0	—
Prunus virginiana	—	—	—	—	5	0	0	60	5	20	0	60	10	10	33	15
Quercus alba	4	0	0	100	78	1	8	89	7	0	0	100	89	8	0	4
Quercus bicolor	—	—	—	—	22	0	9	90	2	0	0	100	24	8	0	5
Quercus macrocarpa	18	16	5	77	6	0	33	66	11	0	0	100	35	17	0	9
Quercus rubra	9	0	33	66	91	2	17	86	10	0	10	90	110	20	0	11
Robinia pseudacacia	—	—	—	—	6	66	16	16	8	62	0	37	14	71	0	24
Thuja occidentalis	—	—	—	—	4	75	0	25	149	3	1	95	153	6	0	3
Tilia americana	14	42	42	14	78	18	55	26	19	21	31	47	111	71	0	23
Ulmus americana	24	54	33	12	51	49	27	23	16	31	37	31	91	76	0	25
Ulmus fulva	—	—	—	—	12	25	33	16	3	33	0	0	15	53	33	30

*Acer rubrum and A. saccharinum. It was impossible, while the ice was on, to distinguish between the two species.

** In ranking the species, those of which less than ten individuals were examined were omitted.

The ten most resistant species in the order of their resistance were the following: *Catalpa speciosa*, *Picea abies*, *Thuja occidentalis*, *Quercus alba*, *Quercus bicolor*, *Carpinus caroliniana*, *Ostrya virginiana*, *Crataegus sp.*, *Quercus macrocarpa*, *Carya ovata*. This is in marked contrast with the findings of Illick* after a

* Illick, J. S.: A Destructive Snow and Ice Storm. Forest Leaves, XV: 103-107.

Pennsylvania storm, where *Carya* ranked first in resistance. *Ulmus*, *Betula* and *Fraxinus* which rank second, third and fourth respectively in Illick's list do not appear among our first ten at all.

Among the factors which make for resistance to ice storm injury the following appear to be of considerable importance.

1. Small surface exposure. Trees with few stout twigs fared better, on the whole, than those with many fine twigs. The first place held by *Catalpa* was due largely to this factor.

Shagbark Hickory. Typical of conditions in farm woodlots

2. Shortness of limb. The longer the branch, the greater the leverage which the weight of ice could bring to bear on the part. A comparison of column 12 with columns 8 and 4 shows that almost invariably small trees were damaged less than larger ones of the same species. While other factors are involved here, shortness of limb played a strong part.

3. Horizontal branching. The accumulations of ice on the horizontal branches of the spruce, etc., soon changed from a bending load to a pulling load, and this was easily carried so long as the weight was symmetrically distributed. The elms and

some of the poplars were at the other extreme as regards this factor, and suffered very severely. Attention is called to the fact that *Ulmus americana* ranked twenty-fifth, and *Populus deltoides* thirty-first, the last on the list.

4. Flexibility of stem. The *Thujas* and *Ostryas* which exhibited a high degree of resistance were in many cases bent into

AMERICAN ELM. Typical of conditions in city streets.

semicircular arches for days after the storm, yet very few were broken, and all the others righted themselves after the ice melted.

5. Strength of materials. High resistance of the oaks was due largely to this factor, the limbs of the oak having, in general, neither great flexibility, favorable angle nor reduced surface. Indeed many of the oaks bore great numbers of leaves during the storm period and the ice accumulated on these as well as on the stems.

It might be added that some species were favored in many cases by some form of external support. For instance, *Carpinus*

often was found leaning its ice loaded branches on other plants growing beside it, while the low branching *Crataegus* rested its weight on the ground.

Without question the effects of injury will be apparent in the storm area for decades to come. Ashe,* writing from the view-point of a forest inspector, states that in the Appalachian forests he has noted deformities of trees which he ascribes to ice storms of a hundred years previous. Ice storm injuries will also pave the way for fungus and insect attacks, and the damage from these secondary causes will in time probably equal that from the original injuries.

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THE DIRECT ASSIMILATION OF FREE NITROGEN BY PLANTS

A REVIEW OF RECENT WORK ON THE SUBJECT

EVA MAMELI DE CALVINO

In May, 1909, at the International Chemical Congress, which took place in London, I presented a paper by my collaborator, Prof. G. Pollacci and myself, entitled: "Sull'assimilazione dell' azoto atmosferico libero nei vegetali superiori," in which we gave the first results obtained from analysis of carefully prepared cultures of various phanerogamous plants grown under sterile conditions and free from combined nitrogen. From our experiments we conclude that the faculty to assimilate free nitrogen from the air is not, as stated in all books on vegetable physiology, peculiar to some microorganisms without chlorophyll, as these analyses demonstrated that there are also phanerogamous plants that can assimilate that element without being in symbiosis with bacteria.

In January of 1911, we published the complete work (1) on the direct assimilation of the nitrogen in plants, having in two years of research extended the experiments and analyses to other plants, such as green algae, lichens, mosses, aquatic hydropter-

*Ashe, W. W.: Note on "Ice Storms in The Southern Appalachians" by Verne Rhoades. Monthly Weather Review, 46: 374.

idae, and aquatic and terrestrial phanerogams. In this investigation care was taken to exclude causes of error owing: 1) to incomplete sterilization of the culture, 2) to the presence of nitrogen compounds of the air and 3) to incomplete development of the plants; factors which were not all taken into consideration by any of the preceding authors in the study of this important problem.

The cultures were made in flasks and vessels of different shapes, and covered by bell-jars sealed at the bottom, through which measured quantities of sterile air free from nitrogenous compounds were passed. The culture media employed were sterile nutrient solutions, or river sand previously washed with hydrochloric acid, or pure quartz sand, fertilized with the nutrient solutions. The seeds were sterilized before being sown, after having been analyzed to determine the total amount of nitrogen they contained. The same was done with the plants obtained from them, after these had grown for a certain length of time.

A carefully measured amount of nitrogenous compounds was applied to some plants, while others were cultivated absolutely free from nitrogen. In the first instance the culture medium was again analyzed after cropping the plants. The quantity of nitrogen the plants had assimilated from the air was determined by subtraction. Analyses were also made in various cases of the air contained in each bell-jar where plants had grown; in other words, it was determined if any decrease in the quantity of the free nitrogen of the air had taken place during the growth of the plants.

The results obtained showed very clearly that the power of absorbing free nitrogen is more general than was believed, as all of the plants tested had taken up free nitrogen in greater or lesser quantities from the air in which respiration and assimilation took place. It is a remarkable fact that the plants took up more free nitrogen from the air when the culture medium was supplied with the small quantities of nitrogenous compounds.

In that part of our paper in which former investigations were considered from a critical standpoint, a discussion of the theory of "albumen generators" of Jamieson was given, demonstrating why this is not acceptable.

In April, 1915, we published another work (2), confuting two publications of Oes and Molliard on the same subject.

Since that time five works have been published on assimilation of atmospheric nitrogen, one of which is of very recent date. These may be considered briefly.

In 1914, Schramm (3), working with pure cultures of seven species of algae in nutrient solutions lacking nitrogenous compounds, found that they did not assimilate nitrogen from the air.

Moore and Webster (4) in 1920 cultivated unicellular green algae in a solution free from nitrogenous compounds and observed that they fixed nitrogen from the air, grew and formed proteids. They obtained, however, a greater and more rapid assimilation of free nitrogen by adding nitrogenous compounds to the nutrient solution.

A year later the same authors with Whitley (5) published another work in which they confirmed and extended the results already obtained, concluding that marine algae, like fresh water algae, can fix elemental nitrogen from water and indirectly from the air in sunlight, but not in darkness. The amount of nitrogen fixed exceeds by many times the total combined nitrogen originally present in the water of the culture in the form of aminos, nitrites, or nitrates.

Moreover, the small initial amounts of nitrogen present in these forms are not decreased during the life of the algae. It thus follows that the only available source is the free nitrogen of the atmosphere.

Another work published in the same year is that of Wann (6), in which an investigation similar to those considered above is extended to other species of algae. The author cultivated seven different species of filamentous green algae in pure sterile cultures on an agar medium containing glucose and mineral substances to which either ammonium nitrate or calcium nitrate was added. The nitrogen which was assimilated was derived from the free nitrogen of the atmosphere. The amount of this food assimilated ranged from 1 to 12.5 mg., representing an increase in the total nitrogen content of the culture flasks of from 4 to 54 per cent.

Five other species of Chlorophyceae were grown on a medium containing ammonium nitrate and calcium nitrate but without glucose. Four of these assimilated very little nitrogen, so that

in the absence of glucose there is but a slight assimilation of this element by algae.

Neither in the presence nor in the absence of glucose or of mannite did fixation occur when urea, glycocoll, asparagin or ammonium sulphate was supplied as the source of nitrogen.

All of these experiments on green algae confirm the old investigations of Frank (7), who cultivated many species of Chlorophyceae, first in unsterilized media, then in sterilized media free from nitrogenous compounds, reaching the conclusion that algae assimilate the free nitrogen of the atmosphere. Identical results were obtained at the same time by Gautier and Drouin (8).

The most recent work published on the assimilation of free nitrogen is that of C. B. Lipmann and J. K. Taylor (9). These authors cultivated wheat plants in nutrient solutions, either without nitrogen or containing nitrogenous compounds. In both cases these solutions were so prepared as to have approximately the same concentration throughout, regardless of whether or not nitrogen was present. In the case of the solution containing no nitrogen, twelve jars were employed, six of them being kept in the greenhouse until seeds were formed. All of the other plants were grown for a period of six weeks only. At the end of the experiment, the authors found that all of the plants had assimilated nitrogen from the air in quantities varying from 13 to 21 per cent of the total amount of nitrogen found in the plant.

The publication in question is of a preliminary nature in which many details are lacking, and the authors do not state whether or not the cultures were sterile, but it is to be presumed that they were, as otherwise the work would be of much less interest. The authors announce that they also have cultures of barley, legumes, etc., under experimentation which promise to yield similar results to those obtained with wheat.

The authors of this interesting work, who are well known in the scientific world for their competence in matters relating to agricultural physiology, express in conclusion the following opinion:

"There can be no question now, however, that the teachings of all our books and nearly all our teachers of the subject to-day are erroneous and must be changed completely to accord with the facts presented by us, and by the other investigators whom

we have cited above. As Moore and Webster have put it, authority has too long held sway over logic and experimental fact. It is high time to let those considerations rule."

These words will appear all the more opportune to-day if it be remembered that about 70 years ago there took place in France the famous controversy between Ville and Boussingault, which impassioned the physiologists and the agronomists of the whole world. At the end of this controversy the victory was unjustly given to Boussingault, who supported the theory that plants do not assimilate free nitrogen from the air. Notwithstanding this decision the experiments of Ville twenty years later received, in part at least, a victorious confirmation from Hellriegel and Willfarth's discovery of the assimilation of nitrogen from the air by the legumes. And if the numerous works published afterwards in Germany and in France did not make it possible to reach a definite conclusion as to whether or not all cases of the positive assimilation of free nitrogen were due to the presence of microorganisms, or if attributable to the direct aerial assimilation by the green cells, the results presented in various papers published by Prof. Pollacci and myself from 1911 until the present (which completely exclude the causes of error not taken into account by preceding investigators) together with those obtained by the authors cited in the present article, appear to us sufficient ground for abandoning the old error and concluding this debated question definitely as follows:

The property of assimilating free nitrogen from the air is more general than heretofore admitted, as all plants, from the algae to the angiosperms, can, according to their condition of life, use this power with more or less activity. Notwithstanding this it is natural that some cultivated species cannot do without the combined nitrogen, which for so long a time has been supplied by the soil. It is also natural that there should exist plants which have a special power to assimilate free nitrogen: real nitrogen accumulators: and this not solely by the presence in their tissues of symbiotic microorganisms, as in the case of legumes and other plants, but also by direct assimilation, as shown by the results of analysis obtained by Pollacci and myself with the following species: Raphanus sativus, Acer negundo, Cucurbita pepo, Polygonum fagopyrum, and various other species.

(1) E. Mameli—G. Pollacci, Sull'assimilazione diretta dell'azoto atmosferico libero nei vegetali (Atti dell'Istituto Botanico di Pavia, Ser. II, XIV, 159–257, Con 3 tavole.) 1911.
(2) E. Mameli—G. Pollacci, Ancora sull'assimilazione diretta dell'azoto atmosferico libero nei vegetali (Atti dell'Istituto Botan. di Pavia, XVI, 197–203).
(3) Schramm, J. R., Grass-green algae and elementary nitrogen (Science, XXXIX, 260) 1914.
(4) Moore, B., T. A. Webster., Studies of photosynthesis in freshwater algae (Roy. Soc. London Proc. Ser. B. 91 (1920), N. B. 638, pp. 201–215).
(5) Moore, B., Whitley E., Webster, T. A., Studies of photosynthesis in marine algae (idem, Ser. B. 92, (1921) N. B. 642, pp. 51–60).
(6) Wann, F. B., The fixation of free nitrogen by green plants (Amer. Journ. of Bot. VIII, 1), 1921.
(7) Frank, B., Ueber die Stickstoffbindenden Algen des Ackerbodens. (Chem. Zeitung, 1888, n. 81).
Ueber den experimentelle Nachweis der Assimilation freien Stickstoffs durch erdbodenbewohnende Algen (Ber. d. B. Bot. Ges. VII, 34) 1889.
(8) Gautier et Drouin, Recherches sur la fixation de l'azote par le sol et les vegetaux. (Comptes rendus des séances de l'Acad. d. France, CVI, 754, 863, 944, etc.) 1888.
(9) Lipman, C. B., Taylor, J. K., Proof of the power of the wheat plant to fix atmospheric nitrogen (Science, LVI, N. 1456, Nov., 1922).

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SHORTER NOTES

Notes On A New Rose-Flowered Robinia From South Carolina

P. O. Schallert

The distribution of the rose-flowered Robinias in the eastern United States seems to be centered in the extreme western part of South Carolina and in the adjoining counties of North Carolina. The greatest multiplication of individual plants seems to occur in western North Carolina, but the greatest development of species seems to have taken place along the western edge of South Carolina.

W. W. Ashe has recently called to my attention a plant which he has in cultivation, the stock of which came from Oconee County, South Carolina, and which seems to be so different

from any other form which has been described or which he has in cultivation, as to deserve consideration as a distinct species. On account of its exceptionally long racemes, showy flowers, and relatively long-flowering season it will undoubtedly prove to be a plant of horticultural value, ranking with *R. viscosa* and *R. longiloba* as an ornamental shrub and tending on account of its suckers to form dense clumps. The description of this proposed species is as follows:

Robinia Ashei, sp. nov. A shrub 1–3 m. high, with smooth brown bark on the stem, which as well as the more vigorous branchlets is armed with nearly terete slender stipular spines 1–1.3 cm. long. Shoot of season, petiole, rachis, peduncle and calyx covered with stiff gland-tipped, but not viscid, hairs or weak bristles of unequal length, mixed with short grayish non-glandular pubescence. Leaves 1.2–2 dm. long, formed of 13 to 17 oblong-ovate or elliptic leaflets, 3–4.6 cm. long and 1.2–2.3 cm. wide, appressed silky canescent as they unfold, at length nearly glabrous above, and sparingly appressed pubescent beneath except on midrib and petiolule which are permanently pubescent. Racemes .9–1.9 dm. long, as long as the leaves or shorter, 18–32-flowered; flowers 22–24 mm. long, bright rose-purple with keel partly white; calyx tubular, 12–15 mm. long, fully one half as long as the flower, the long acuminate glandular-hirsute divisions 8–10 mm. long. This plant is not known to set fruit.

Oconee County, South Carolina, W. W. Ashe. This plant resembles *R. longiloba* Ashe(Journ. El. Mitch. Sci. Soc. 37: 175) in the size and color of its flowers and in its gland-tipped, non-viscid pubescence, but is well separated by having longer racemes, much longer calyx lobes and its greater pubescence.

For this species I propose the name of **Robinia Ashei** in honor of its discoverer, W. W. Ashe of Washington, D. C., who has for several years been cultivating the dwarf locusts.

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A COMMON NAME FOR PHACELIA PURSHII

In the September-October, 1923, number of Torreya, I was interested in Professor Hansen's note on *Phacelia Purshii*, since I had never observed the tendency he describes, although the plant was familiar to me in my youth. I do not question the writer's observations at all, but when he states that the plant has no recognized common name, I want to tell him about one that we used in western Ohio, in the valley of the Great Miami River. We called it "Miami Mist," and I learned the name from the late A. H. Vance, naturalist and lover of wild flowers, of Troy, Ohio. And this common name may be found in *A Class-Book of Botany*, by Alphonso Wood, 1853 ed., p. 437.

G. Clyde Fisher

A NEW SAXIFRAGE FROM OREGON

Saxifraga Gormani, sp. nov.

Perennial; rootstock horizontal, short; scape erect, densely covered with glandular, reddish pubescence; 2–3 dm. high; the rather broad panicle ½–¼ as long. Leaves basal, deltoid-ovate or elliptical, or rarely nearly orbicular, the larger ones 3–4 cm. long, sometimes slightly cordate at base, mostly short-petioled, upper side glabrous, the lower with sparse, brown pubescence, the margin crenate or only slightly wavy, more or less ciliate or puberulent. Branches of the panicle terminated by short, mostly few-flowered cymes; bracts lanceolate, 5–10 mm. long, or the upper shorter; pedicels 5–10 mm. long. Calyx glabrous, with very short tube; lobes ovate or roundish, reflexed, about 2 mm. long. Petals on short claws, elliptical, white, about 3 mm. long. Stamens a little shorter than the corolla; the filaments club-shaped but acute at the upper end, white; the anthers about as long as broad, orange-yellow. Ovaries 2, free from the calyx and from each other, greenish with a yellowish disk at base, the stigma nearly sessile at first. The ripe carpels 3–4 mm. long, conical-ovate, the upper part curved outward; the style about 0.5 mm. long. Seeds 0.5 mm. long, ovate or oblong, obtuse or acutish at the ends, brownish.—Collected by *Mr. M. W. Gorman* on moist rocky slopes, Elk Rock, Multnomah County, Oregon, June 2, 1917, No. 4081.—This species is much

like *S. fragosa* in appearance, but the two plants are not very closely related. *S. fragosa* Sksd. differs in having a more adnate calyx with spreading, narrower lobes; prominently 3-nerved, sessile petals; subulate, shorter filaments; and shorter follicles that have shorter, yet more strongly curved beaks.

WILHELM SUKSDORF

BOOK REVIEW

THE LARGER BRITISH FUNGI*

"The object of this Handbook," says Mr. Rendle in the preface, "is to supply an introduction to the study of the larger British fungi. When considering the preparation of a new edition of the 'Guide to Sowerby's Models of British Fungi,' by the late W. G. Smith, which had served also as an introduction to the systematic study of the larger fungi, it was thought that its value might be increased by including all the British genera of Basidiomycetes. This has now been done, and additional figures have been added from Smith's 'Synopsis of British Basidiomycetes.' The Introduction has been greatly extended, the descriptions generally have been revised and enlarged, and additional matter of economic and biological interest has been included. Mr. Ramsbottom has, in fact, rewritten the book, while retaining the form and arrangement of the original 'Guide'."

The volume contains 222 pages of text and 141 figures. The introduction treats of fungi in general and their main groups; fairy rings; luminosity; mycorrhiza; changes in color when sporophores are cut or broken; poisonous and edible fungi; fungi as food; and the ecology of the fungi. Under Basidiomycetes, the author treats at some length not only their classification but also their cytology, morphology, and development. In connection with *Amaniata phalloides*, the deadly poisonous fungi are discussed, with symptoms and treatment; while under *Psalliota campestris* the growing of mushrooms is described. In the same way, much interesting and valuable information is distributed throughout the volume in connection with suggestive species.

* Ramsbottom, J. A Handbook of the Larger British Fungi, pp. i–iv, 1–222. British Museum, London, 1923. Price 7/6.

No attempt has been made to alter nomenclature or to eradicate certain errors common to most texts on this subject. The book can be recommended to students as probably the best guide to the larger fungi of England to be had in compact form, and as a very convenient introduction to most of the genera of the basidiomycetes and ascomycetes occurring in temperate regions.

W. A. Murrill

NEWS NOTES

Dr. W. A. Murrill left for South America on January 12, to be gone three months. He was sent by the New York Botanical Garden on a Mycological expedition to secure specimens of fungi in Argentina, Brazil, and British Guiana. He sailed on the S. S. "Van Dyck" direct to Buenos Aires and will make several stops on the return journey.

Dr. Arthur Hollick was the official representative of the Torrey Club as well as of the New York Botanical Garden and the Botanical Society of America at the Commemorative Meeting to Joseph Leidy held in Philadelphia on December 6th.

At the annual meeting of the New York Academy of Sciences Dr. Robert A. Harper made the presidential address on Growth and Form in Plants.

From Science we note that Dr. H. A. Gleason of the New York Botanical Garden has recently resigned his position as assistant director and become curator. He will devote most of his time to the study of the flora of northern South America. Dr. Marshall A. Howe succeeds Dr. Gleason as assistant director of the Garden.

Mr. Wilhelm Suksdorf, who describes a new Saxifrage in this issue, has just published the first two numbers of "Werdenda" a pamphlet to be issued at irregular intervals describing new species of plants from Washington. In number two of the magazine he describes twenty six new species and varieties of plants. The magazine is printed in German.

ERRATA

On page 41 (number 3) for *Arctostaphylos unedo* read *Arbutus unedo*.

On page 68 (number 4), line 20, for "var. of form" read "var. as form."

INDEX TO VOLUME TWENTY-THREE

(The names of species and varieties described as new and of new combinations are in **bold faced type**.)